

ANALYSIS OF BARRIERS TO THE UTILITY OF GENERAL AVIATION
BASED ON A USER SURVEY AND MODE CHOICE MODEL

by

TROY D. DOWNEN

Bachelor of Science, Aerospace Engineering
University of Kansas, 1993

Master of Science, Aerospace Engineering
University of Kansas, 1995

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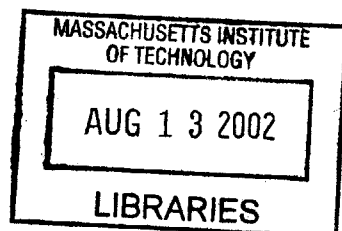
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Signature of Author: _____
Department of Aeronautics and Astronautics
January 18, 2002

Certified by: _____
R. John Hansman, Jr.
Professor of Aeronautics and Astronautics
Director, International Center for Air Transportation
Thesis Supervisor

Accepted by: _____
Wallace E. Vander Velde
Professor of Aeronautics and Astronautics
Chair, Committee on Graduate Students



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Submitted to the Department of Aeronautics and Astronautics
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ABSTRACT

General aviation is an underutilized transportation mode, particularly when compared to alternative modes such as the automobile and the commercial airlines. In this research, barriers to the utility of general aviation were identified through a web-based survey of active general aviation pilots, with 1,471 surveys returned and suitable for analysis. The survey data indicated five key barriers which were thought by pilots to be currently reducing their ability to utilize general aviation transportation to its fullest extent: weather, expense of the travel mode, a lack of mobility at the destination, doorstep-to-destination travel time, and reduced access to general aviation transportation.

A mode choice model was also constructed to further examine some of these barriers, including travel expense and doorstep-to-destination travel time. While the model considered only key quantitative factors such as travel distance, time and the travelers' value of time, it proved to be quite powerful in demonstrating how general aviation utility is affected by changes in the key factors.

From the survey data, and analysis with the mode choice model, several key issues emerge as being important to increasing the utility of general aviation transportation. Improved weather information, including real-time information in the aircraft cockpit, as well as near all-weather capability for general aviation aircraft and better access to ground transportation at the travel destination would significantly increase utility. Furthermore, modifying the business model for owning and operating general aviation aircraft may be the best near-term strategy for lowering the expense of general aviation transportation. Analysis with the mode choice model also indicates that increasing the speed of general aviation aircraft will not necessarily translate into an increase in the utility of general aviation transportation.

Thesis Supervisor: R. John Hansman, Jr.
Title: Professor of Aeronautics and Astronautics

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My gratitude is also extended to my colleagues at the International Center for Air Transportation here at MIT. They tolerated my endless questions about the airline industry as well as web-based surveys, and were also subjected to some of my first draft surveys. In all, a great bunch of folks.

Naturally I am in debt to the literally hundreds of pilots who responded to my survey, plus the dozens who contacted me with further comments and helpful advice. There are many generous people who hold a great interest in ensuring the continued growth of general aviation. I hope that I have been able to make some positive impact, no matter how small, to that end.

I also extend my sincerest appreciation to my sponsor and employer, Raytheon Aircraft Company, and particularly to my mentor, Dr. Leland Johnson, Jr. His wise council kept me properly focused on my goals and soundly grounded in both academic, personal and professional matters. I look forward to years of further collaboration.

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LIST OF ACRONYMS

AAA	American Automobile Association
AAMA	American Automobile Manufacturers Association
AOPA	Aircraft Pilots and Owners Association
ATC	Air Traffic Control
ATP	Airline Transport Pilot
BEA	United States Bureau of Economic Analysis
BTS	United States Bureau of Transportation Statistics
CFI	Certified Flight Instructor
CFII	Certified Flight Instructor Instrument
DUATS	Direct User Access Terminal Service
EAA	Experimental Aircraft Association
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FHWA	United States Federal Highway Administration
FSS	Flight Service Station
GA	General Aviation
GAMA	General Aviation Manufacturers Association
GPS	Global Positioning System
HITS	Highway-in-the-Sky
HTML	Hypertext Markup Language
ICAT	The International Center for Air Transportation
IFR	Instrument Flight Rules
MEI	Multi-Engine Flight Instructor
MIT	Massachusetts Institute of Technology
MTOW	Maximum Takeoff Weight
NBAA	National Business Aviation Association
PIC	Pilot in Command
TCAS	Traffic Alert and Collision Avoidance System
VB	Microsoft Visual Basic programming language
VFR	Visual Flight Rules
VOT	Value of Time

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1 INTRODUCTION

This research focuses on barriers which act to reduce the utility of general aviation transportation. The motivations for this research are reviewed in this chapter, as well as the approaches taken to studying these barriers. An overview of the format of this document is also presented in this chapter.

1.1 Motivation

In 1998, the latest year for which data is available, the U.S. Federal Highway Administration reports that there were nearly 185 million valid drivers' licenses in the United States (US FHWA, 2000). In the same year the Federal Aviation Administration reports that there were 618,298 active U.S. pilot certificates (GAMA, 2001). Furthermore, in 1998 over 5.5 million cars were produced domestically (US BEA, 2000), while the General Aviation Manufacturers Association reports that 2,220 units were shipped by general aviation manufacturers based in the United States in the same year (GAMA, 1998). Finally, in 1999 nearly 488 billion revenue passenger miles were flown domestically on scheduled and non-scheduled commercial air carriers (US BTS, 1999). These statistics clearly indicate that the automobile is a mode of transportation accessible to, and utilized by, far more people in the United States than general aviation. In addition, over the past 50 years commercial air travel has become a widely accepted mode of travel for both business and leisure purposes, whereas travel by GA aircraft has not enjoyed the same level of popularity. These observations raise the important question of what barriers may be acting to reduce the utility of general aviation transportation.

1.2 Overview of Approaches

Barriers to the utility of general aviation were identified through a web-based survey of active general aviation pilots. The survey was made available on the Internet for approximately 2 months and promoted through various Internet and print media. In all, 1,471 surveys were returned as suitable for this research.

Analysis of the survey data indicated five major barriers which were thought by pilots to be currently reducing their ability to utilize GA transportation to its fullest extent. A mode choice model was then constructed to further examine some of these key barriers, including travel expense and doorstep-to-destination travel time. The model considered only key quantitative factors such as travel distance, time and the travelers' value of time, but proved to be quite powerful in demonstrating how GA utility was affected by changes in the key factors.

1.3 Overview of the Document

This research on barriers to the utility of general aviation aircraft is documented here in seven chapters plus three appendices. This first chapter presents a brief introduction to the subject matter. The detailed web-based survey design, execution, limitations and results are presented in Chapter 2, with the bulk of the discussion located in Section 2.4 where the survey results are documented. In Chapter 3 the mode choice model is introduced, with a review of mode choice theory in Section 3.1 and a detailed discussion of the model implementation in Section 3.2. The key barriers to the utility of general aviation are presented in Chapter 4, with a brief discussion of the relative advantages of various transportation modes being first presented in Section 4.1.

Major conclusions of the research are presented in Chapter 5 and references used in the research are included in Chapter 6. Appendix A contains a copy of the web-based survey, while the survey results are presented in their entirety in Appendix B. The final appendix, Appendix C, contains derivations of representative general aviation aircraft costs used in the mode choice model.

2 SURVEY: BARRIERS TO UTILITY OF GENERAL AVIATION

An Internet-based survey was developed to establish a statistically significant basis for determining the relative importance of various barriers to travel by general aviation (GA) aircraft. The survey was uploaded to a server at the Massachusetts Institute of Technology and made publicly available to any person, worldwide, with an Internet connection and World Wide Web browser software. Survey participants submitted their results anonymously via the Internet, and all completed surveys were then analyzed for this research

Between late July, 2001 and September 10, 2001 there were 1,471 complete and distinct surveys submitted and subsequently used in this research. On September 11, 2001 the survey form was removed from the website and replaced with a short explanation of removal. The author had some concern that the terrorist attacks on that date might bias survey results pertaining to airline travel, but of more concern would be the author's inability to prove that bias had not been introduced due to the attacks.

The design and execution of the survey is discussed in this chapter as well as some limitations inherent in the survey. Survey results are also presented and briefly discussed. Further discussion of the survey results and their implications for the utility of GA travel may be found in Chapter 4. A complete copy of the reduced survey data, in graphical form, may be found in Appendix B. A complete copy of the web-based survey may be found in Appendix A.

2.1 Design

The major goal of the survey was to aid in determining what barriers are currently reducing the utility of general aviation travel in North America. As a starting point, motivated users of the current North American general aviation system were targeted for the survey. "Motivated users" included pilots and passengers of various experience levels who currently travel by GA aircraft on a regular basis. The rationale for this target group was that any factors that reduced the utility of GA travel to this group would likely reduce utility for less frequent, and perhaps less experienced users as well. For a statistically significant sampling of the target group, the survey would need to be available to as large an audience in the aviation community as possible. Fortunately the Internet proved to be an ideal vehicle for this purpose.

Anecdotal evidence was first gathered on barriers to GA utility from a handful of experienced pilots. This data aided in designing relevant questions for the survey, and the final survey was also reviewed by pilots for clarity.

At the top of the survey, the motivation for the research was briefly explained. Before starting the survey, participants were also assured that completing the survey was voluntary and that all responses would be anonymous. The survey was then divided into four sections containing a total of 20 questions. Section I addressed the need for information on basic demographic characteristics, pilot ratings and experience. Questions in Section II were oriented toward how the survey participants currently use GA aircraft for travel – how many trips have been taken recently, how the GA aircraft was accessed, and whether the participant typically acts as pilot-in-command (PIC). Data was also gathered for a direct comparison to how airline travel is utilized. An important aspect of Section III was to collect information regarding how factors are weighed

in selecting among various transportation modes. Issues included which modes were considered in planning travel, what factors play into the mode decision process and how those factors change with the travel purpose. Participants were also asked to consider the relative advantages of various travel modes. In Section IV, those surveyed were asked an open-ended question pertaining to their opinions on how to improve the utility of GA transportation. This question largely served to check for consistency with prior questions on utility barriers, as well as to allow the individual to address additional issues not raised earlier. Finally, the last question in the survey posed a hypothetical dispatch service to the individual and sought their opinion on the usefulness of the service.

Some survey questions restricted the user to simple yes/no responses, or guided the user to respond on a discrete scale (e.g. not important/somewhat important/very important). Most survey questions allowed participants to write their responses in text boxes in an open-ended, free-form manner. The goal of this technique was to prevent the survey from guiding participants into answers preconceived by the survey designers. Actual responses on completed surveys varied from short, numbered items to quite lengthy essays on the topic at hand. Analysis of the responses for these questions proved to be significantly more labor intensive than the more restricted responses (see Section 2.2.2).

Some questions were designed to be purposely repetitive so that consistency in the responses could be checked. Some of the free form response questions were slightly reworded and then posed as a new question with restricted responses, allowing for specific issues to be checked for consistency as well as importance.

Three questions considered travel at or beyond given distances. In question 5 the stated distance was 75 statute miles or greater, and in questions 17 and 18 it was 100 statute miles. The purpose in question 5 was to exclude shorter trips across town or daily commutes, as well as to give a common basis to all survey participants for answering the question. Seventy-five miles was a common basis for questions asked in the 1995 Nationwide Personal Transportation Survey (US DOT, 1995), with which it was desired that some survey data could be compared. In questions 17 and 18 a common basis was provided as well as a round number that participants could deal with in estimating costs. For many single-engine piston aircraft 100 statute miles also translates into just under an hour of flight time for those pilots who know their hourly costs. A distance was stated in question 17 (rather than flight time) for direct comparison of the data to the automobile in question 18. Statute miles were quoted rather than nautical miles since most individuals could then consider a local town or destination that they may drive to as well as fly.

Although “general aviation” is a term that has been carefully defined by the General Aviation Manufacturers Association, as well as others, the term was not defined in the survey. This omission was intentional so that responses would not be limited by any definitions imposed by the survey. Instead, participants were asked to identify an aircraft type that they would then consider when responding to survey questions. As will be seen in the discussion of the results, most participants identified a single engine piston aircraft type for the survey.

2.2 Execution

Specifics on how the survey was disseminated and the data collected and analyzed are presented in this section.

2.2.1 Survey Dissemination

The survey form was coded in hypertext markup language (HTML) using a commercially available software package. The appropriate HTML files were then uploaded to a server available to students at MIT for web publishing. The complete survey, as shown in Appendix A, was then available to anyone worldwide with an Internet connection and World Wide Web browser software.

A survey participant would visit the website, fill out the survey form, and then click the “submit” button at the bottom of the survey. The data was then collected by a special program resident on the MIT server for these purposes, formatted into a text message, and then sent to the author’s MIT email address. Data from each individual survey was downloaded by the author as a separate email lacking an electronic return address. Thus all survey data submissions were anonymous unless participants explicitly identified themselves in one of the responses. The author’s contact information (email address, phone number and US Postal address) was also made available at the top of the survey in case participants had questions or wished to further discuss the research topic.

The existence and purpose of the survey was publicized through several major aviation news outlets, both Internet based and printed media. In addition, organizations such as the National Business Aviation Association (NBAA) and the Experimental Aircraft Association (EAA) posted notices of the survey on their websites. The International Center for Air Transportation (ICAT), a research lab at MIT, also maintains a list of approximately 400 email addresses of individuals who have previously participated in surveys and expressed interest in future surveys. These individuals received an email notice of the survey, and further notices were forwarded to various flying clubs and Internet bulletin boards, mailing lists and chat sites. Of interest is the fact that nearly 1000 responses were received within two days of a notice of the survey being included in AVweb’s AVflash Internet-based newsletter. AVweb is an Internet-based aviation magazine and news service located at <http://www.avweb.com>.

2.2.2 Data Reduction

Survey responses were received via email as plain text messages, which were then saved as text (.txt) files to a local computer hard drive. Over 1500 email responses were received, including some significantly incomplete surveys (only 2-4 questions answered) and exact duplicates (perhaps due to clicking the “submit” button twice, or an error of the MIT server software). Of these, 1,471 were distinct and complete enough to use in this research.

A Visual Basic (VB) subroutine was written using tools included with Microsoft Excel 2000 to format and process the data. This routine copied the raw data from each text file into a single Excel worksheet. Questions with limited responses, such as numerical data (e.g. age, flight hours) or discrete responses (e.g. male/female) were automatically categorized by the VB routine, summarized for all 1,471 responses, and charted for study by the author and inclusion in

this publication. Vital statistics for the data (e.g. percentages, mean, standard deviations) were also calculated by the VB routine.

Free-form responses were individually analyzed by the author over a period of several weeks, and responses were categorized according to issues mentioned by the survey participants. For example, if a new Issue A was mentioned in a particular response then a new category, Category A, was created and one “X” was logged under that category. After all surveys were analyzed, most categories had from a few dozen to several hundred “X” marks. The VB routine then counted the number of “X” marks in each category and could chart the frequency with which various issues were mentioned. In the presentation of the survey results (Section 2.4) the various categories created for each question will be discussed and example issues cited for each category.

For example, question 15 asked survey participants to cite some advantages traveling by automobile had over traveling by GA aircraft. The following represents a typical response:

1) Much more convenient and flexible over short distances 2) Cheaper 3) Safer 4) Can handle heavy and bulky cargo 5) Can drive in most bad weather

The various categories marked for this response would then include “ease of access,” “flexibility,” “less expensive,” “safety,” “payload capacity,” and “weather not a factor.” Obviously there is room for interpretation in each response, but best efforts were made to at least maintain consistency in how responses were categorized for each question. The discussion in Section 2.4 will present examples of issues that were grouped into the various categories to better enable the reader to interpret the data.

It is interesting to note that the majority of the pilots participating in the survey responded with a common vocabulary and common subject matter on many of the free-form questions, thus simplifying the categorization in most cases. In addition, it was not atypical for the exact same phraseology to be used when addressing certain issues (e.g. airport closures, tort reform), perhaps indicating that the pilots who filled out the survey often access the same aviation-related news services, read the same opinion-editorials, and perhaps attend the same functions (e.g. EAA’s Air Venture at Oshkosh) where arguments are presented on the issues discussed.

2.2.3 Results Sorting by Characteristics

All 1,471 survey responses were analyzed together for overall patterns discussed in the presentation of the survey results (Section 2.4). Survey responses were also sorted by four participant characteristics: aircraft owners, aircraft renters, heavy users of general aviation for travel, and heavy users of commercial airlines for travel. Aircraft owners and renters were identified in survey question 3, with 480 survey participants typically renting their aircraft and 670 wholly owning their aircraft.

“Heavy GA users” were identified as those who indicated in question 1 that 10+ trips were taken in the last 12 months on any GA aircraft for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Seven hundred and twenty-three (723) survey participants were categorized as “heavy GA users.”

“Heavy airline users” were identified as those who indicated in question 1 that 10+ trips were taken in the last 12 months on any scheduled airline for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Two hundred and fourteen (214) survey participants were categorized as “heavy airline users.”

During the data analysis, those who indicated 10+ uses of GA for business trips were also separated from those who indicated 10+ uses of GA for leisure/personal trips. The same sorting was also performed for airline users, but in neither case were significant differences observed from grouping into the more general “heavy GA users” and “heavy airline users” categories.

The most significant differences from the general survey population observed in these four alternate sortings will be briefly discussed in the presentation of the survey results (Section 2.4). A complete copy of the survey data sorted by these four characteristics is included in Appendix B.

2.3 Limitations

As mentioned previously, the major goal of the survey was to aid in determining what barriers are currently reducing the utility of general aviation travel in North America. Pilots and passengers who currently travel by GA aircraft on a relatively regular basis were targeted by the survey with the rationale that any factors that reduced the utility of GA travel to this group would likely reduce utility for less frequent, and perhaps less experienced users as well. The fundamental assumption underlying the discussion of utility barriers is, then, that the barriers presented are valid for current GA users, and likely are valid for new entrants and infrequent users as well. The few student respondents in the survey are not numerically large enough to draw standalone, meaningful conclusions regarding which barriers are specifically valid for them.

In addition, barriers to entering the GA travel system (e.g. initial pilot training) have not been explicitly addressed by this survey. It is likely that a new survey targeted at a different audience would be required to adequately address barriers to entry.

All survey responses were submitted before the September 11, 2001 attacks on the New York World Trade Center and Washington D.C. Pentagon using commercial airliners (Boeing 767 and 757 aircraft). The full course of new restrictions for both airline and general aviation (and possibly automobile) travel are yet unknown and may significantly affect the barriers discussed here (e.g. ease of access to travel modes, doorstep-to-destination travel time).

2.4 Presentation of Survey Results

Major survey results are presented and briefly discussed in this section. Each of the 20 survey questions (plus the questions involving background information) are discussed separately and in the order in which they appear on the survey.

Results are typically summarized in the form of a chart, with a discussion following to clarify issues of importance. Survey participants were not obliged to answer every question, therefore the results of each question are accompanied by the number of participants who answered that

particular question, typically as a box on the chart indicating “N= XXX” where “XXX” are the number of responses received.

A total of 1,471 distinct surveys were submitted before September 11, 2001. Appendix B contains a complete copy of the survey data collected, including four alternate sortings by various characteristics, as discussed in Section 2.2.3. A copy of the actual survey may be found in Appendix A.

2.4.1 Section I: Background Information

This section of the survey addressed the need for information on basic demographic characteristics and pilot ratings and experience. Participants were also asked to identify one “general aviation aircraft” in this section and then to consider it for the rest of the survey.

The data from this section indicates that in many respects the survey participants generally reflect nationwide active pilot population characteristics reported by the Federal Aviation Administration (FAA). With only two exceptions, characteristics of the overall survey population did not significantly change when aircraft owners/renters and heavy users of GA/commercial airlines were isolated for study (see Section 2.2.3). The two exceptions – the number holding IFR ratings and the level of flight experience – are noted in this section where appropriate.

2.4.1.1 *Certificates and Ratings*

Survey participants were asked for the following information:

**Certificate (please
check one)**

- ☐ Student
- ☐ Recreational
- ☐ Private
- ☐ Commercial
- ☐ Airline Transport

Instructor:

- ☐ I am CFI, CFII or MEI rated

Instrument Rating

- ☐ I am instrument rated
- ☐ I am a VFR pilot

**Airplane Class Rating
(check all that apply)**

- ☐ Single Engine - Land
- ☐ Single Engine - Sea
- ☐ Multi Engine - Land
- ☐ Multi Engine - Sea

Type Rating(s):

As shown in Figure 1, slightly over half of the survey participants held a private pilot certificate, with approximately another one-third holding a commercial certificate. According to data published the FAA and compiled by the General Aviation Manufacturers Association (2001) (Figure 2), the survey population over-represents private and commercial pilots while under-representing students and airline transport pilots (ATP). In addition, 16.1% of those who completed the survey indicated that they held an instructor rating. The national average is 12.9% (GAMA, 2001).

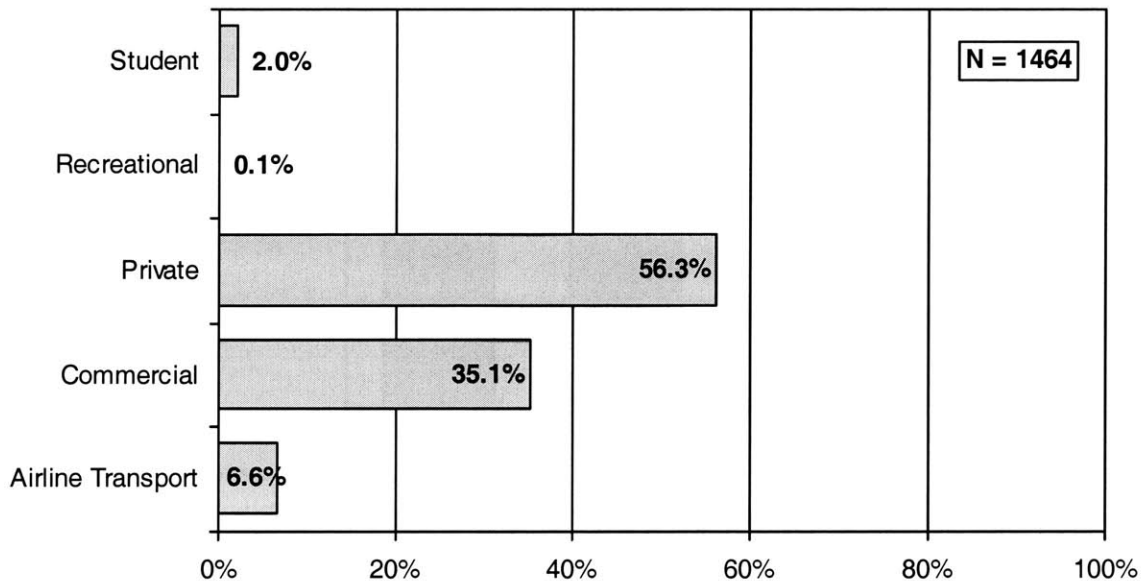


Figure 1: Survey Respondents' Pilot Certificate

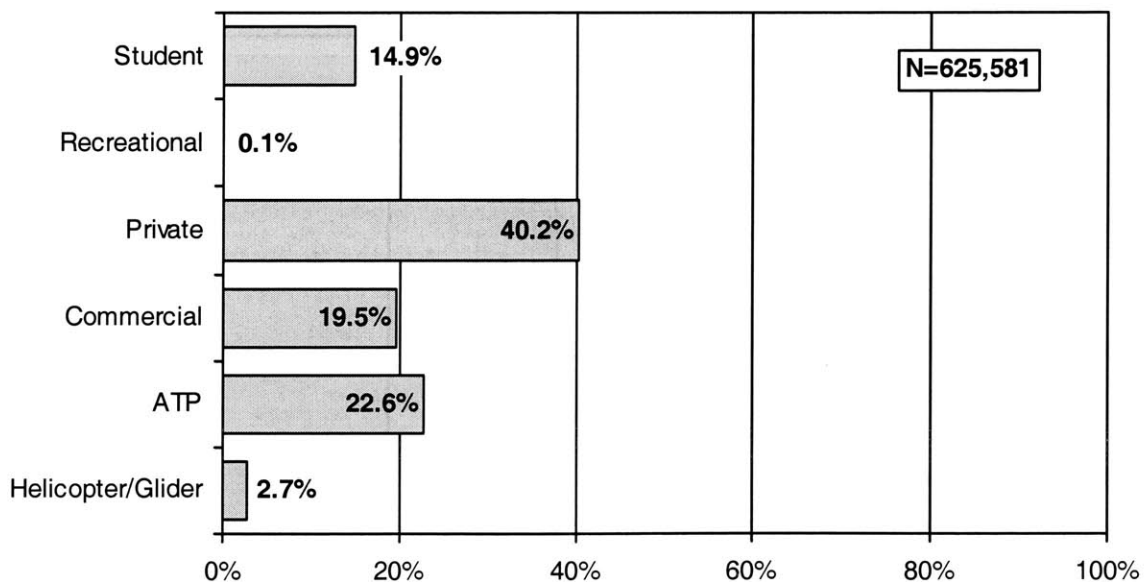


Figure 2: Active U.S. Pilot Certificates Held in 2000 (GAMA, 2001)

As shown in Figure 3, 65.6% of the surveyed pilots indicated they were instrument rated, compared to 49.9% of total active U.S. pilots (including student & recreational pilots) according to data compiled by GAMA. The percentage of those instrument rated in the survey was somewhat higher among aircraft owners (72.0%) and lower among aircraft renters (52.3%).

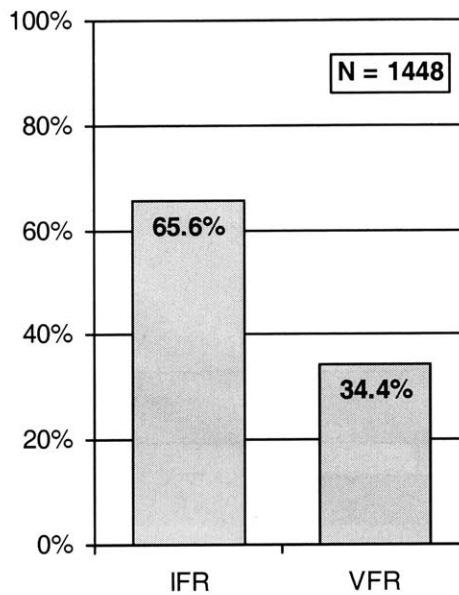


Figure 3: Survey Respondents' Instrument Rating

Over 95% of survey pilots were rated in single-engine land aircraft, with about one-third rated in multi-engine land aircraft (Figure 4). Note that participants were allowed to indicate multiple ratings, so the percentages total to more than 100%.

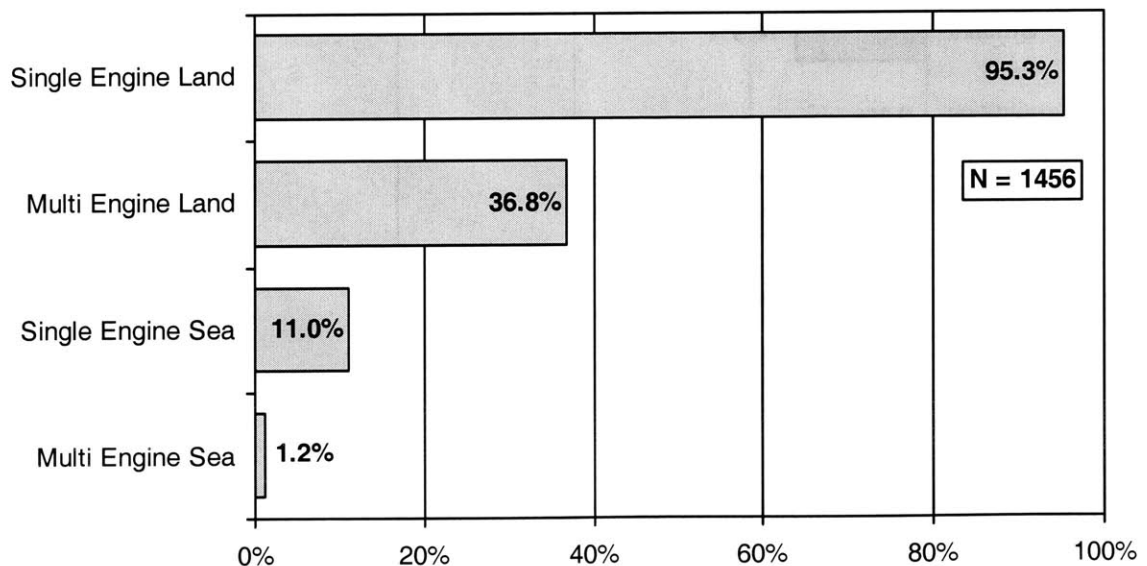


Figure 4: Survey Respondents' Airplane Class Rating

In addition, 20.2% of those responding indicated one or more type ratings in specific aircraft ranging from various rotorcraft and lighter-than-air balloons, to commercial aircraft such as the Boeing 747.

2.4.1.2 *Flight Experience*

Survey participants were asked for the following information:

Total Flight Hours:

Which type of GA aircraft do you currently fly? (Please consider this aircraft when answering the remaining questions in this survey.)

- ☐ Single engine piston
- ☐ Multi engine piston
- ☐ Single engine turboprop
- ☐ Multi engine turboprop
- ☐ Jet less than 20,000 lbs MTOW (e.g. Cessna CJ1, Beechjet, Learjet 31, etc.)
- ☐ Jet 20,000 to 100,000 lbs MTOW (e.g. Hawker 800, Falcon, G-V, etc.)
- ☐ Large transport (e.g. Boeing BBJ, Airbus ACJ)

Where is your home base for the aircraft you indicated above? (Airport code or city & state)

Survey respondents' total reported flight hours are shown in Figure 5. Although the mathematical mean is 2,277 hours, the median is 800 hours, which indicates that the mean is not indicative of the typical survey participant's flight experience. This is clear from Figure 5 where one can see the long upper tail in the data. Regardless, most of the pilots surveyed are moderately experienced, with approximately three-quarters reporting 2,000 hours or less. Nearly one-third report between 100 and 500 hours of flight experience.

Among those who rent their aircraft the median dropped to 301 hours, and increased to 1,200 hours for those who wholly own their aircraft. Those classified as "heavy GA users" (see Section 2.2.3) maintained the higher median of 1,200 hours, while those classified as "heavy airline users" returned to the overall survey median of 800 hours.

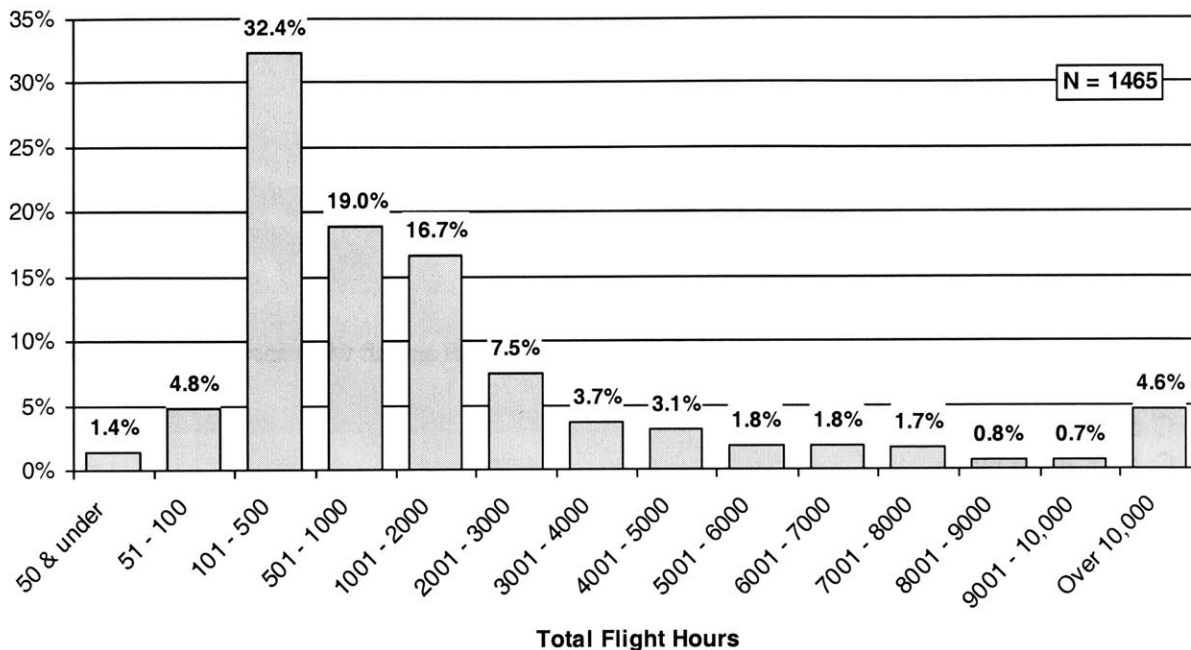


Figure 5: Survey Respondents' Total Flight Hours

The data in Figure 6 indicates that most of those surveyed considered a single-engine piston aircraft as their general aviation aircraft when answering the remaining questions in the survey. As mentioned in Section 2.1, the term “general aviation” was not defined in the survey.

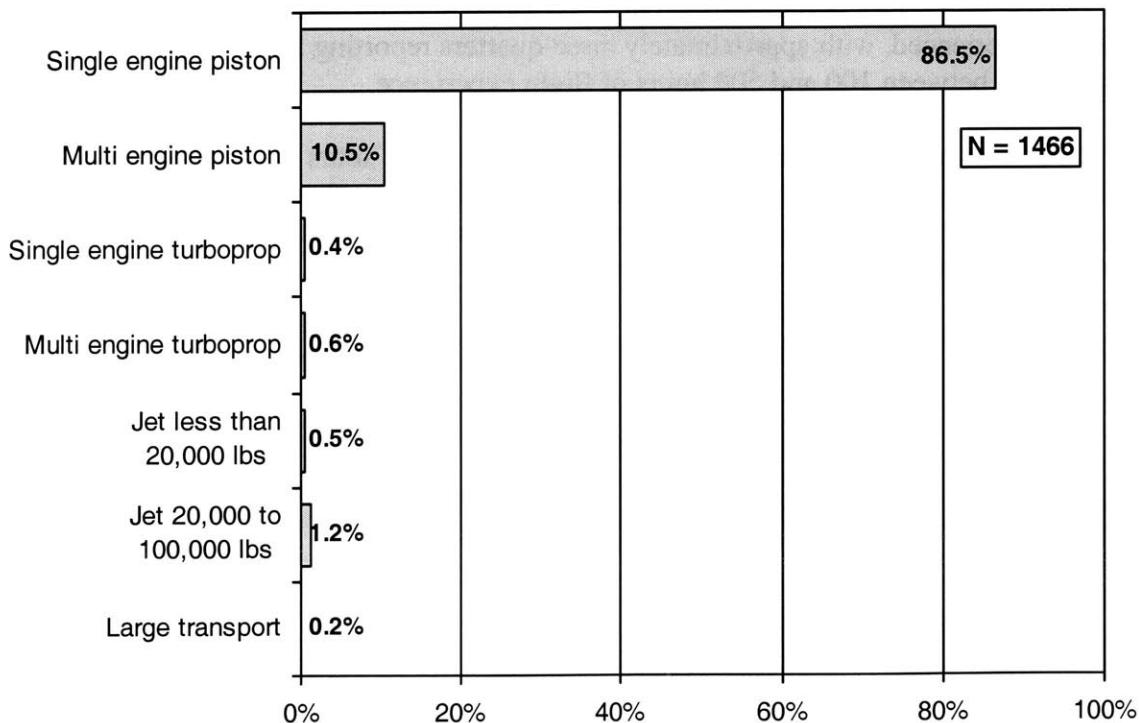


Figure 6: Survey Respondents' Current Airplane Type Considered for the Survey

Of the 1,471 survey participants, 98.0% indicated a home base for their aircraft. Only 19 of these home bases were not in the United States or Canada, indicating that at least 96.7% of all survey respondents typically fly in the North American system. Twenty-seven (27) of the respondents indicated a home base in Canada.

2.4.1.3 Statistical Information

Survey participants were asked for the following information:

Gender: ☒ Male ☐ Female

Age:

As indicated in Figure 7, 94.0% of those taking the survey were male. This survey male/female pilot ratio precisely corresponds to the active U.S. pilot population ratio (GAMA, 2001).

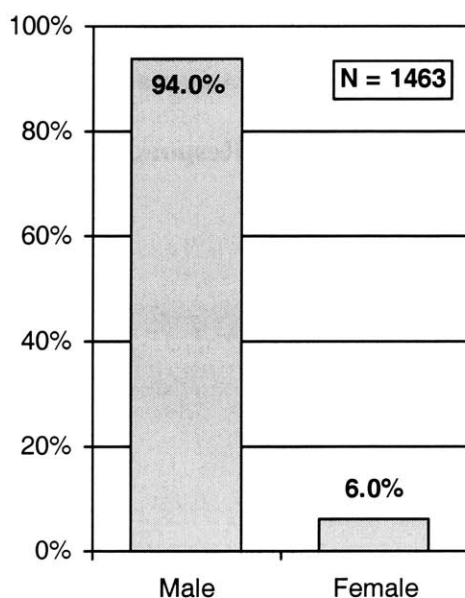


Figure 7: Survey Respondents' Gender

The mean age of survey respondents was 46.8 years (Figure 8), compared to the national average of active U.S. pilots, which is 43.7 years (GAMA, 2001). Nearly 75% of those responding to this survey question indicated that they were over the age of 40.

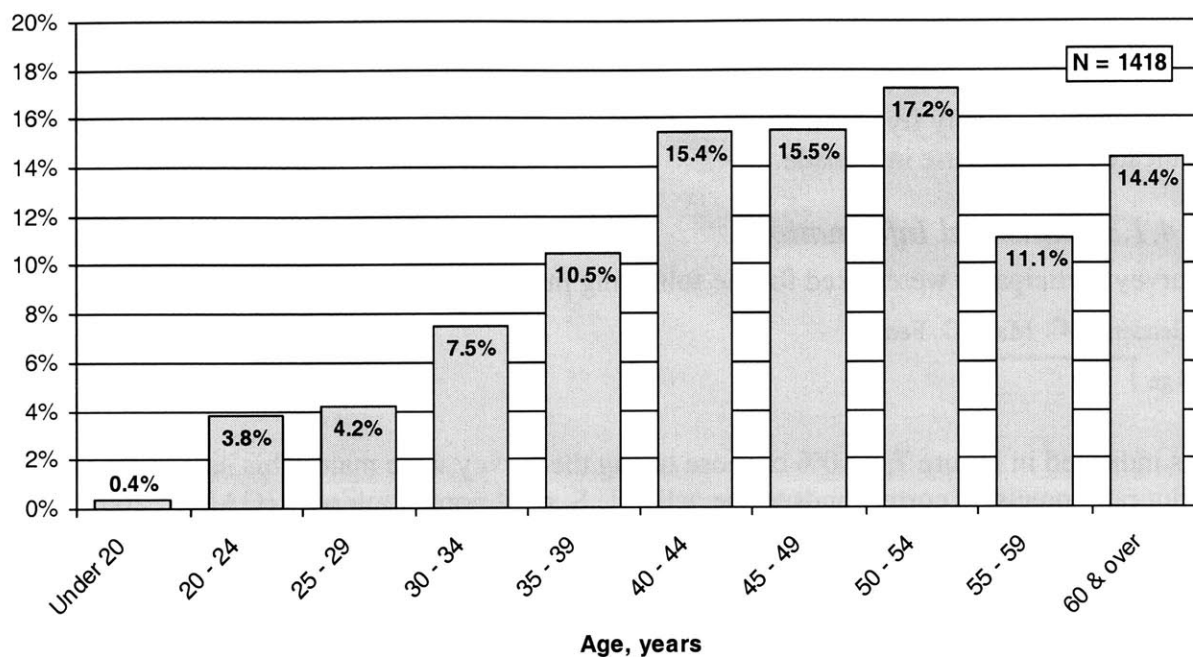


Figure 8: Survey Respondents' Age

2.4.2 Section II: General Aviation Usage

Questions in this section of the survey were oriented toward how the survey participants currently use GA aircraft for travel – how many trips have been taken recently, how the GA aircraft was accessed, and whether the participant typically acts as pilot-in-command (PIC). Data was also gathered for a direct comparison to how airline travel is utilized.

The first two questions in the survey are similar in format and were designed to be comparable for correlation of trip purpose and travel mode. Both questions will therefore be discussed together.

***Question 1:** How many trips have you taken on any GA aircraft for the following purposes in the last 12 months: (a trip is defined as one flight from origin to destination plus return and any intermediate stops, or as one flight for training or recreational purposes)*

Transportation to & from a business destination: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Transportation to & from a leisure/personal destination: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Pure recreation: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Training: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Other: Specify: <input type="text"/>
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***Question 2:** How many trips have you taken on any scheduled airline (including commuters) for the following purposes in the last 12 months: (a trip is defined as one flight from origin to destination plus return and any intermediate transfers & layovers)*

Transportation to & from a business destination: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Transportation to & from a leisure/personal destination: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Pure recreation: <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-5 times <input type="radio"/> 6-9 times <input type="radio"/> 10+ times	Other: Specify: <input type="text"/>
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The responses to questions 1 and 2 regarding business and leisure/personal travel are combined in Figure 9 and Figure 10. Responses to “0 times” are not shown in the figures, but total percentages do add to 100%. The data indicates a somewhat heavier use of the airlines than GA for occasional business travel (1-5 times in the last 12 months) as well as significantly heavier use of GA than the airlines for frequent personal travel.

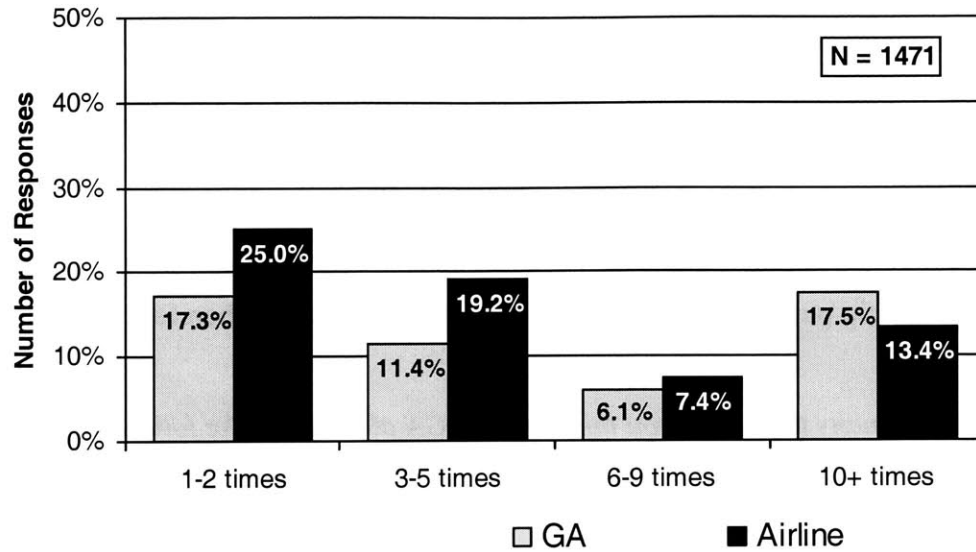


Figure 9: Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

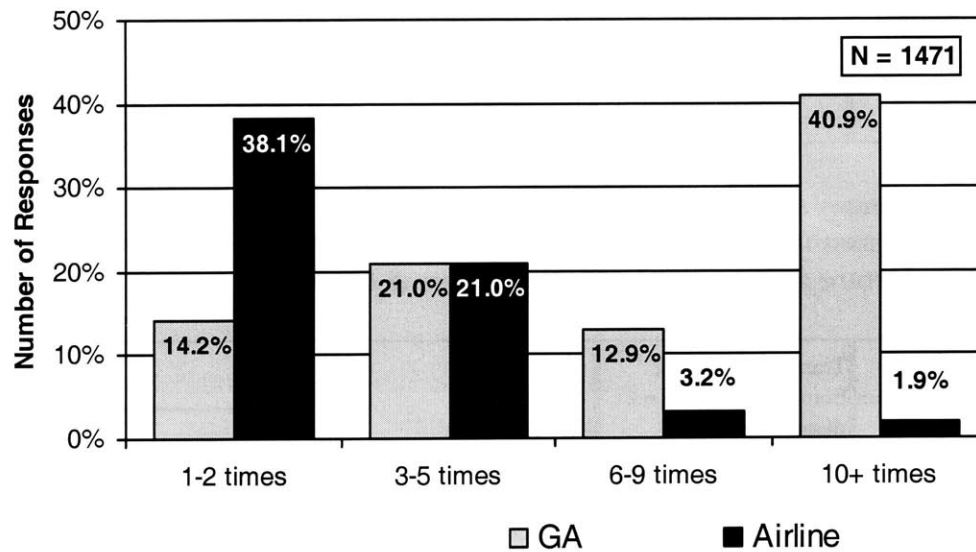


Figure 10: Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

Perhaps of more interest is a comparison of questions 1 and 2 in an effort to find correlations between trip purpose and travel mode. In Table I, for all responses to questions 1 and 2 in the business destination category, the number of responses to each trip frequency are shown. For example, 169 individuals indicated that they had flown on any GA aircraft “0 times” for business, but had flown on a scheduled airline “1-2 times” in the last 12 months. Similar data is shown in Table II for leisure/personal trips.

Table I: Number of Surveyed Pilots Who Took Trips For Transportation To And From A Business Destination

Trips On GA Aircraft	Trips On Any Scheduled Airline				
	0 times	1-2 times	3-5 times	6-9 times	10+ times
0 times	315	169	107	40	71
1-2 times	78	74	49	22	32
3-5 times	42	37	39	20	30
6-9 times	22	22	19	7	19
10+ times	57	66	69	20	45

Table II: Number of Surveyed Pilots Who Took Trips For Transportation To And From A Leisure/Personal Destination

Trips On GA Aircraft	Trips On Any Scheduled Airline				
	0 times	1-2 times	3-5 times	6-9 times	10+ times
0 times	56	60	39	6	0
1-2 times	72	86	43	6	2
3-5 times	113	134	50	7	5
6-9 times	64	75	35	9	7
10+ times	221	206	142	19	14

In Table III, for answers only to question 1 (GA trips), the number of responses to trip frequency are itemized by purpose. For example, 157 individuals indicated that they had not flown on any GA aircraft for business purposes, but had flown “3-5 times” on any GA aircraft for leisure/personal trips in the last 12 months. Similar data for question 2 (airline trips) is shown in Table IV.

Table III: Number of Surveyed Pilots Who Took Trips On Any GA Aircraft

Business Trips	Leisure/Personal Trips				
	0 times	1-2 times	3-5 times	6-9 times	10+ times
0 times	121	120	157	84	220
1-2 times	12	38	59	40	106
3-5 times	6	15	30	24	93
6-9 times	1	10	17	14	47
10+ times	21	26	46	28	136

Table IV: Number of Surveyed Pilots Who Took Trips On Any Scheduled Airline

Business Trips	Leisure/Personal Trips				
	0 times	1-2 times	3-5 times	6-9 times	10+ times
0 times	211	199	87	12	5
1-2 times	151	133	63	14	7
3-5 times	99	103	70	10	1
6-9 times	26	50	25	4	4
10+ times	39	76	64	7	11

Looking first to the data in Table III for trips on GA aircraft, 346 surveys indicated 6 or more trips for business purposes in the last 12 months (total of trips in the last two rows of Table III).

Of these 346 responses, 65.0% (225) also indicated 6+ trips for personal/leisure purposes. This indicates that if one frequently uses GA travel for business trips, one is also likely to frequently use GA travel for personal trips. On the other hand, of the 792 responses that indicated 6+ personal trips on GA aircraft (total of trips in the last two columns of Table III), only 28.4% (225) also indicated 6+ business trips on GA aircraft. Thus if a person frequently takes personal or leisure trips by GA aircraft this is not necessarily an indication that they will use GA frequently for business travel. One possible reason for this asymmetry concerns the reliability of travel by general aviation aircraft. Data from later questions in this survey will indicate that the reliability of the travel mode is more important for business travel than for leisure travel, and that GA travel is relatively unreliable, especially in the face of adverse weather. Looking then at the survey population that frequently travels via GA aircraft for personal trips (792), only a minority of the population (225) may find GA reliable enough for frequent business travel. That same minority, however, comprises 65% of the total population that frequently travels for business (346). Hence, the asymmetry may be due in part to the need for higher reliability (vis-à-vis weather, as will be later indicated) in the GA transportation mode before it can be more fully utilized for business travel. This issue is further discussed in Section 4.2.1.

In examining the data in Table IV for airline trips, the use of scheduled airlines for personal or leisure trips is quite low, regardless of how frequently business trips are made on the airline. This prevents any meaningful conclusions from being drawn from this data regarding the correlation between utilization of the airline for personal and business travel. All that can truly be said is that the pilots in this survey use the airlines only infrequently for personal and leisure travel.

In Table I for business travel, of the 346 surveys indicating frequent use (6+ times) of GA aircraft for business trips, only 91 (26.3%) also frequently use scheduled airlines. Conversely, of the 306 frequent users of scheduled airlines for business, only 91 (29.7%) also frequently use GA aircraft. At best, this indicates a weak negative correlation between the frequent use of scheduled airlines and GA aircraft for business purposes. If one frequently uses GA aircraft for business travel, one may be disinclined to frequently use scheduled airlines for business travel, and vice versa. However, the data trends in Table I do not strongly support this hypothesis.

Again, in Table II the use of the airline for personal/leisure travel is quite low regardless of how GA is used. Meaningful conclusions are difficult to draw from this data, other than to say again that participants in this survey infrequently use the airlines for personal and leisure travel.

The responses to questions 1 and 2 regarding flight for pure recreation are shown in Figure 11. Nearly half of those responding indicated that they had flown 10 or more times in the last 12 months on a GA aircraft purely for recreational purposes. This would tend to indicate a good deal of utility is being found in GA aircraft for purposes other than travel.

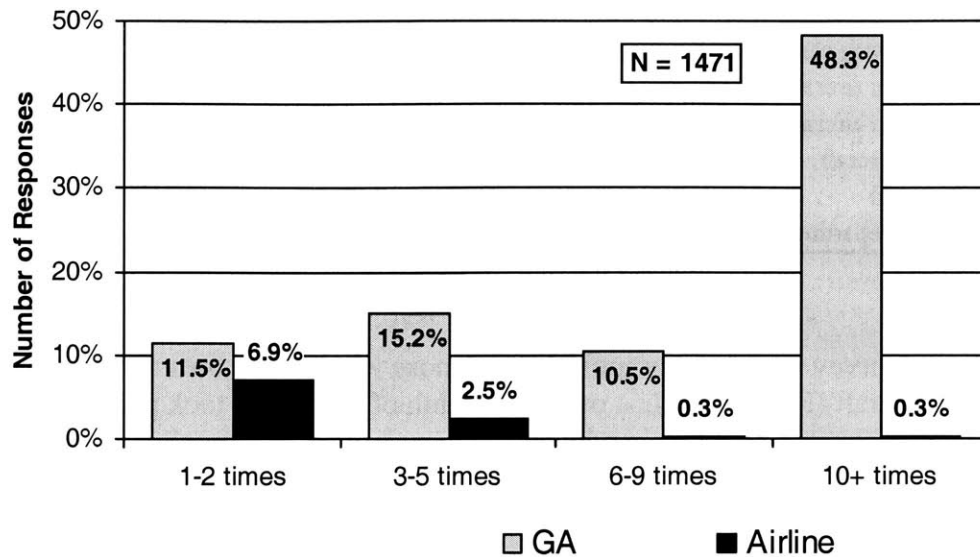


Figure 11: Q1 & Q2 - Trips Taken For Pure Recreation

The data in Figure 12 also indicate that GA aircraft are being used by those surveyed, although perhaps to a lesser extent, for training purposes. Only question 1, regarding GA aircraft, presented survey participants with the option of having traveled for training purposes. Omitting this from the airline focus of question 2 was an error, as some surveys indicated under “other” in question 2 that they had flown on an airline for training. These surveys were submitted exclusively by pilots with ATP certificates. However there were only a handful of these responses for question 2.

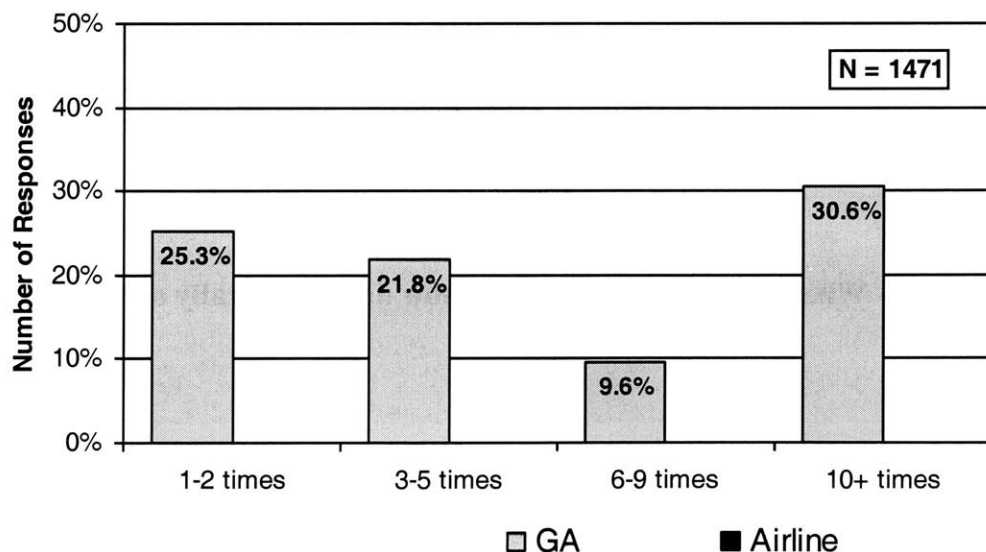


Figure 12: Q1 & Q2 - Trips Taken For Training

Question 3: When you fly on GA aircraft, how do you typically obtain the aircraft?

- ☐ Rent (e.g. from flying club, local FBO)
- ☐ Own a share in an aircraft through a fractional program
- ☐ Own a share in an aircraft through a partnership with one or more people
- ☐ Wholly own an aircraft
- ☐ Charter an aircraft
- ☐ Company flight department
- ☐ Other, specify:

Pilots taking the survey were largely split between those who wholly own an aircraft and those who rent their aircraft (Figure 13). Just over one-eighth of those who took part in the survey share an aircraft through a partnership with one or more people or through a formal fractional ownership program. The financial benefits of sharing aircraft ownership will be discussed in detail in Section 4.2.2.

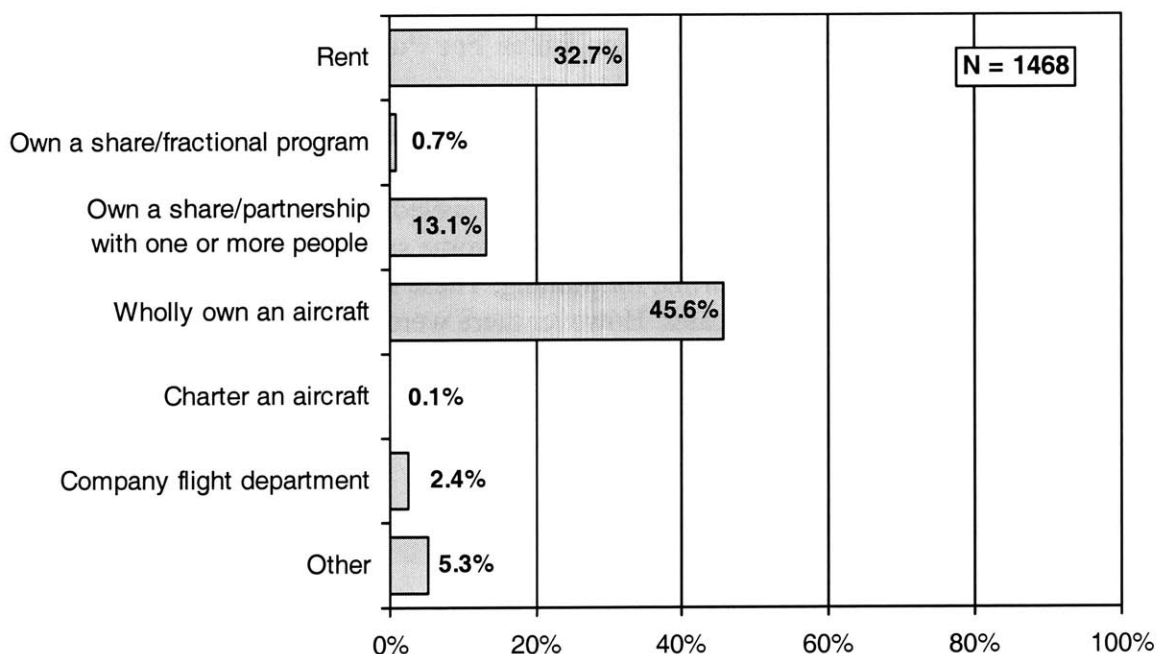


Figure 13: Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

Question 4: *When you fly on GA aircraft are you typically the pilot in command?*

- ☐ Yes
- ☐ No

The overwhelming majority of those who participated in the survey typically act as pilot in command (PIC) when they travel by GA aircraft (Figure 14). As will also be shown later in question 11, to travel by GA aircraft survey participants act as PIC and thus give up the potential to use the travel time for another purpose such as conducting business. This is one potential advantage of other modes such as airline travel over GA transportation, although it will be shown in question 10 that most pilots in this survey did not consider it an important advantage.

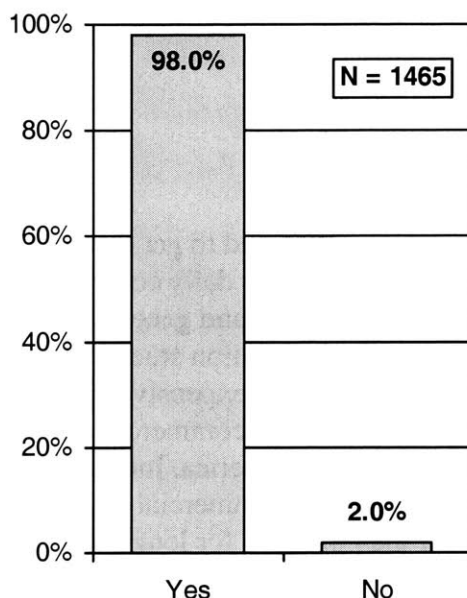


Figure 14: Q4 - When you fly on GA aircraft are you typically the pilot in command?

2.4.3 Section III: Barriers to General Aviation

An important aspect of Section III was to collect information regarding how factors are weighed in selecting among various transportation modes. Issues included which modes were considered in planning travel, what factors play into the mode decision process and how those factors change with the travel purpose. Participants were also asked to consider the relative advantages of various travel modes. Finally, this section was used to evaluate how participants consider their costs when traveling by auto and general aviation.

Question 5: When you are making travel plans, which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

- ☐ Automobile (e.g. car, truck, van)
- ☐ Commercial airline
- ☐ Commercial bus (e.g. Greyhound)
- ☐ Commercial rail (e.g. Amtrak)
- ☐ General aviation

A travel distance of 75 statute miles was specified to get survey respondents to think about longer trips rather than short trips across town or daily commutes to and from work. As indicated by Figure 5, the automobile, commercial airline and general aviation are all considered on a relatively equal basis for longer trips. Transportation studies indicate that long distance commercial bus transportation has become an inexpensive niche service principally for low value of time travelers (Gronau, 1970). Long distance commercial rail service is limited in its availability and destinations served in North America. Intermodal access between rail travel and the two most popular travel modes, auto and commercial air, is also limited, which likely contributes to low consideration of the rail mode for long distance travel. Studies indicate that the European model of rail service, with greater availability and intermodal access, results in greater use of the mode for long distance travel (*Airline Business*, 2001).

The degree to which the various modes of transportation were considered among heavy users of GA and heavy users of the airlines was largely unchanged from the general survey population.

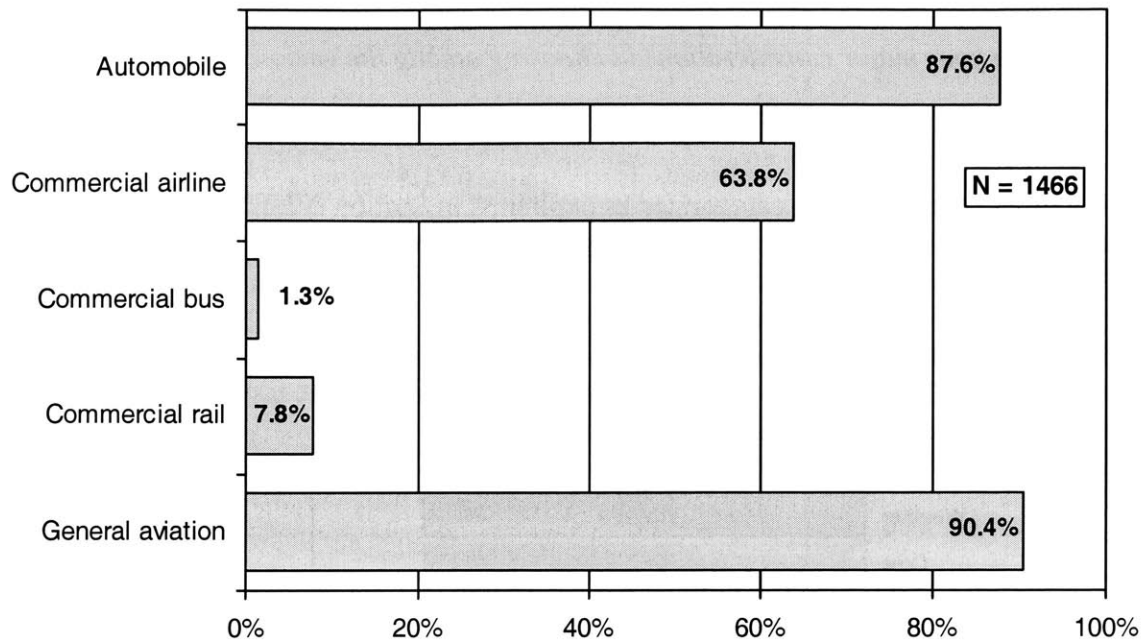


Figure 15: Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

Question 6: *When evaluating GA transportation against other travel modes (car, airline, etc.) what factors are your major considerations in choosing among the various modes of transportation?*
(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 16, and each is briefly addressed below. “Other” responses included factors such as terrain that will be over-flown, pilot currency, age of the travelers, employer prohibitions, airspace congestion, and avoiding highway automobile traffic. En route weather, mode cost, travel time and convenience of the travel mode ranked as top considerations in choosing among the various modes of travel. The issue of mobility at the destination also ranked highly among the considerations.

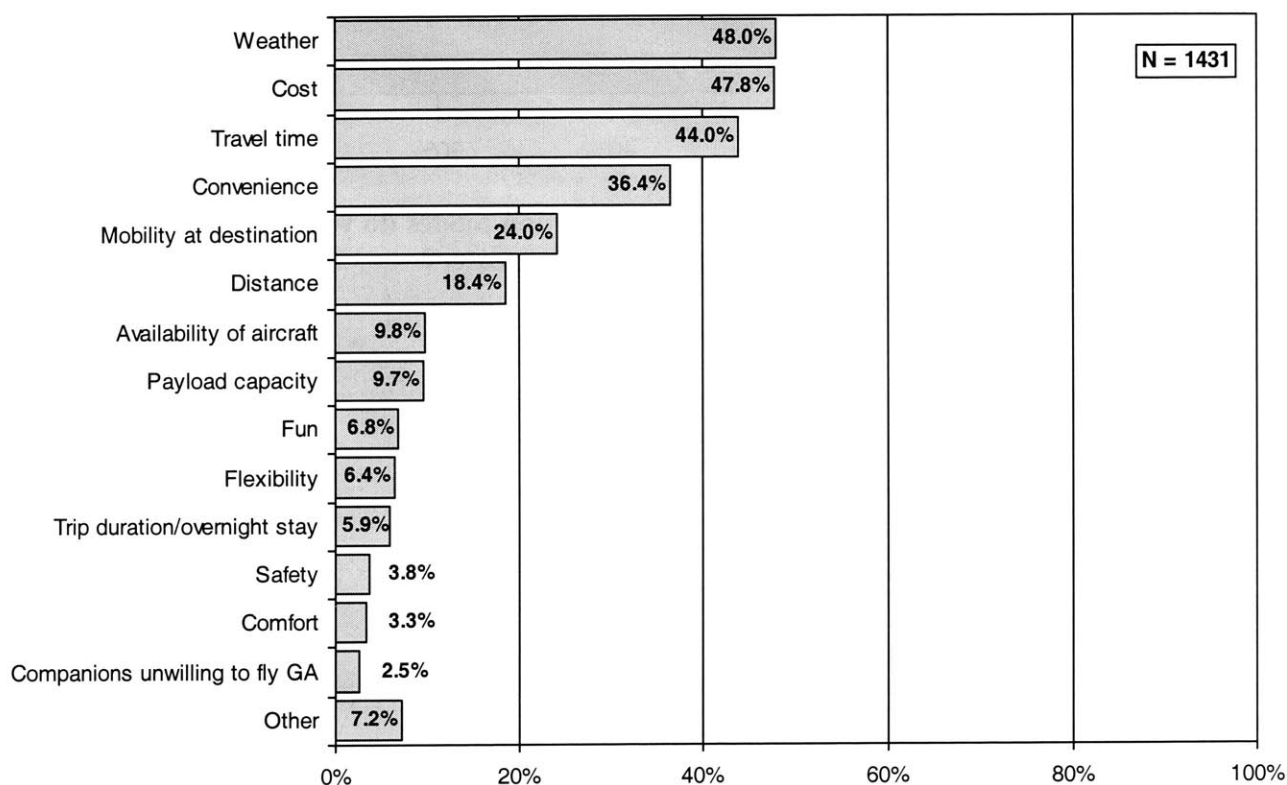


Figure 16: Q6 - What factors are your major considerations in choosing among the various modes of transportation?

Weather: The forecast or actual weather during the trip was cited most often as a major consideration when choosing among travel modes. Specific types of weather (e.g. thunderstorms, known icing) were cited by a minority of those identifying weather as a consideration. Of those who indicated weather, 24% placed it specifically within the context of being a factor that influenced their ability to reliably reach their destination.

Cost: The expense of the travel was also ranked as a top consideration when choosing among travel modes. Issues categorized under cost included not only the personal cost of the trip to the

traveler, but also whether an employer might be paying for the travel. The employer's decision to pay for the travel might also be dependent on the travel mode and/or expense. In some cases the respondent specifically indicated that an employer was willing to reimburse for airline travel but not for travel by GA aircraft, or alternatively that an employer would reimburse only up to the cost of an airline ticket. The results of questions 8 and 13 reinforce the idea that costs of travel are important in transportation mode decisions. The expense of flying GA ranked high in both of these questions as major reasons for choosing to *not* travel by GA aircraft.

Travel time: Survey respondents typically indicated that this consideration not only included the actual time spent traveling en route, but also included the total doorstep-to-destination travel time. This is consistent with comments from question 8 where travel time was also rated as an important factor in choosing against GA travel. In question 13 the speed of the travel mode, which can be closely related to travel time, was also rated as a factor in deciding to not travel by GA aircraft.

Convenience: When citing convenience as a consideration most of those surveyed associated it with ease of accessing the travel mode, either at their travel origin or destination. This included factors such as whether a commercial airport was located nearby or if a general aviation airport was located near their destination. This also included the fact that an automobile was typically easier to access (e.g. parked nearby) than other transportation modes. Also considered under "convenience" is the additional effort involved with preflight activities for a GA aircraft, including route planning and weather checks. Responses to questions 8 and 13 suggest that, although an important consideration, convenience is only an occasional factor in choosing against GA aircraft for any given trip.

Mobility at destination: Nearly one-out-of-four of those who responded to this question indicated that the availability of transportation at their destination was an important consideration. This typically included access to public transportation, taxis or rental cars. The cost of the transportation and length of time they could access the transportation (keep a car for several days, call a taxi late at night) was also considered under this category. Survey participants indicated here, and in question 8, that access to ground transportation at GA airports was often problematic. In question 13 this issue ranked as the fourth most highly rated as being a factor in decisions to not travel by GA aircraft.

Distance: The travel distance is necessarily coupled with several other factors (e.g. time, cost), but 18.4% of those who responded to this question simply indicated "distance" as a major consideration. Some respondents also indicated that GA aircraft only held an advantage (such as travel time or cost) up to certain distances, beyond which the commercial airlines became advantageous. Others indicated that extreme distances were too fatiguing for travel by automobile or GA aircraft. A few cited transoceanic or transcontinental distances as being impractical for traveling in their GA aircraft.

Availability of aircraft: This category included not being able to access a GA aircraft for travel due to mechanical difficulties, scheduling conflicts with other share owners, or lack of available aircraft to rent at a local fixed base operator (FBO). Also included in this category was availability of an aircraft for extended travel periods and overnight stays. Results here are

consistent with data from questions 8 and 13 indicating aircraft availability as a factor in choosing to not travel by GA aircraft.

Payload capacity: The ability to carry luggage, cargo and/or accommodate passengers was cited by 9.7% of respondents as a major consideration in choosing their travel mode.

Fun: This category included responses regarding the pleasure, fun, excitement and satisfaction of traveling by a particular mode.

Flexibility: Included here is the issue of being able to change travel plans at the last minute, including changes in both schedule and trip destination. Changes in traveling companions (who and how many) was also mentioned.

Trip duration/overnight stay: The temporal length of the trip was considered important to those who responded in this category. Some indicated that this could affect other factors such as the availability of a GA aircraft or the price of airline tickets (e.g. Saturday night stay).

Safety: The safety of traveling by the particular mode was a major consideration cited by 3.8% of the survey participants. "Safety" was typically indicated as personal and/or passenger safety while en route.

Comfort: The relative comfort of the various modes of travel was indicated as a major consideration by 3.8% of those who took the survey. Factors in this category included fatigue of traveling by the mode, ability to relax or eat a meal, personal space available during travel, and noise level.

Companions unwilling to fly GA: Some survey respondents indicated that a major consideration in choosing travel mode was that traveling companions were unwilling to use general aviation in their travel. This did not include explicit employer prohibitions against using GA, which represent less than 1% of the responses and are therefore grouped under the "Other" category.

The top considerations for the overall survey population remained top factors for aircraft owners and those who typically rent their aircraft as well. However, cost dropped to fourth place among aircraft owners, superseded by weather, travel time and convenience as the most frequently mentioned considerations. Conversely, cost of the travel mode was mentioned more frequently among those who typically rent their aircraft, growing from 47.8% for the overall survey population to 69.9% for those who rent. The availability of aircraft also enters the top six categories in getting mentioned by 19.1% of those who rent, as opposed to 9.8% of the overall survey population (Figure 17).

It is interesting to note that, as one of the top barriers to emerge in this survey, weather was mentioned equally frequently by renters and owners alike as a major consideration in choosing among various modes of transportation.

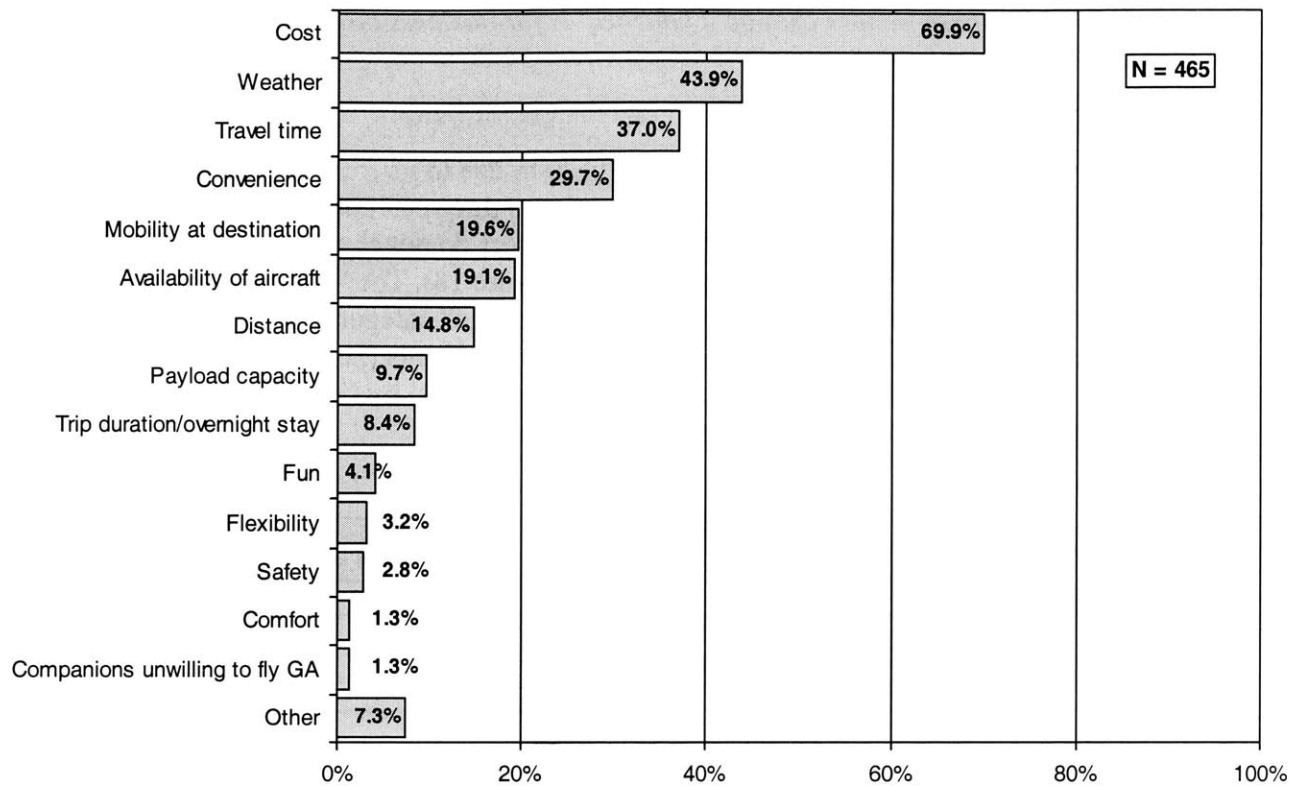


Figure 17: Q6 – (Renters) What factors are your major considerations in choosing among the various modes of transportation?

Question 7: How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?
(free form response)

A wide range of responses were received for this question due to its free-form nature. Of the 940 answers to this question, responses were first grouped into three categories: The factors in question 6 do change with the purpose of the trip, the factors do not change, and employer explicitly prohibits travel by GA aircraft for business (Figure 18). The “employer prohibits” responses could arguably be considered part of the “no change” category. However, since the purpose of the trip essentially does not change for these participants (no business trips by GA allowed) their responses were kept separate from those who travel by GA for various purposes but do not change their major considerations stated in question 6.

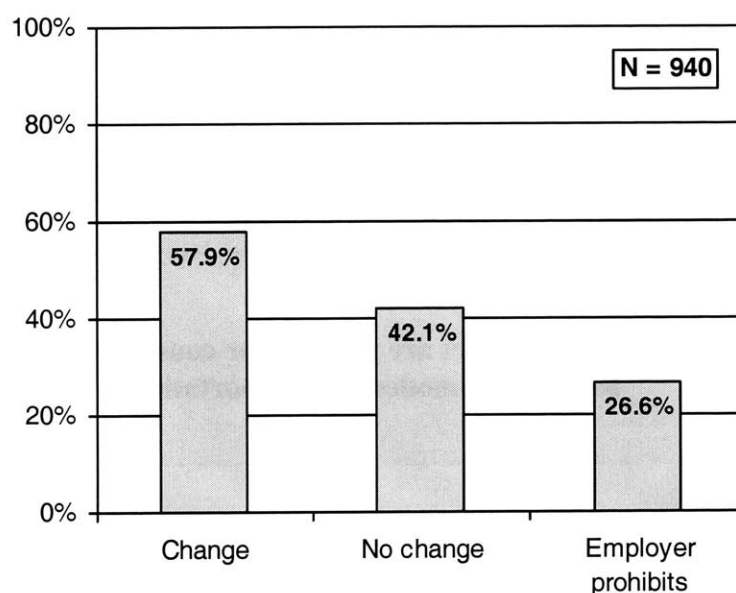


Figure 18: Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

The statistic of interest is that nearly 58% of the responses to this question indicate that people do change their major considerations as the purpose of the trip changes. These responses were then grouped into those that indicated changes for leisure and personal trips, and those that indicated changes for business trips. Note that some responses may have indicated changes for both purposes so percentages will not sum to 100% in the next two figures.

For leisure and personal travel nearly one quarter of the respondents indicated that costs became more important than they were for business travel (Figure 19), presumably because many business travel expenses are reimbursed by an employer. Responses to question 10 also confirm the greater importance of expense for leisure/personal travel than for business travel.

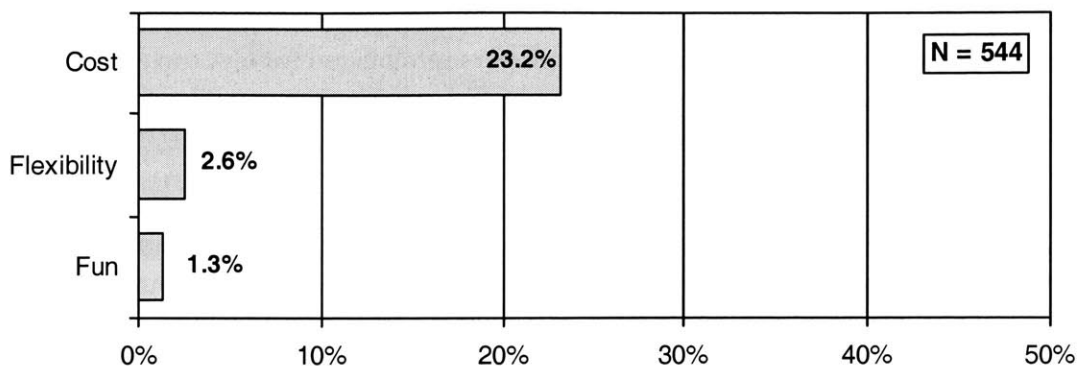


Figure 19: Q7 - For Leisure/Personal Trips: Factors That Become More Important

For business trips nearly half of the respondents indicated that reliability of the travel mode became more important than it was for leisure and personal travel (Figure 20). The ability to get to their desired destination as scheduled was cited as the paramount consideration for many business travelers. The travel time, including in many cases the total time from doorstep-to-destination, was more important for business travel for 25.2% of those indicating a change with travel purpose. Many expressed a desire for the travel time to be as short as possible so they could attend to business and then return home, or so they could make multiple business appointments in a single day. Responses to question 10 again confirm these preferences when those surveyed were asked explicitly for each trip purpose.

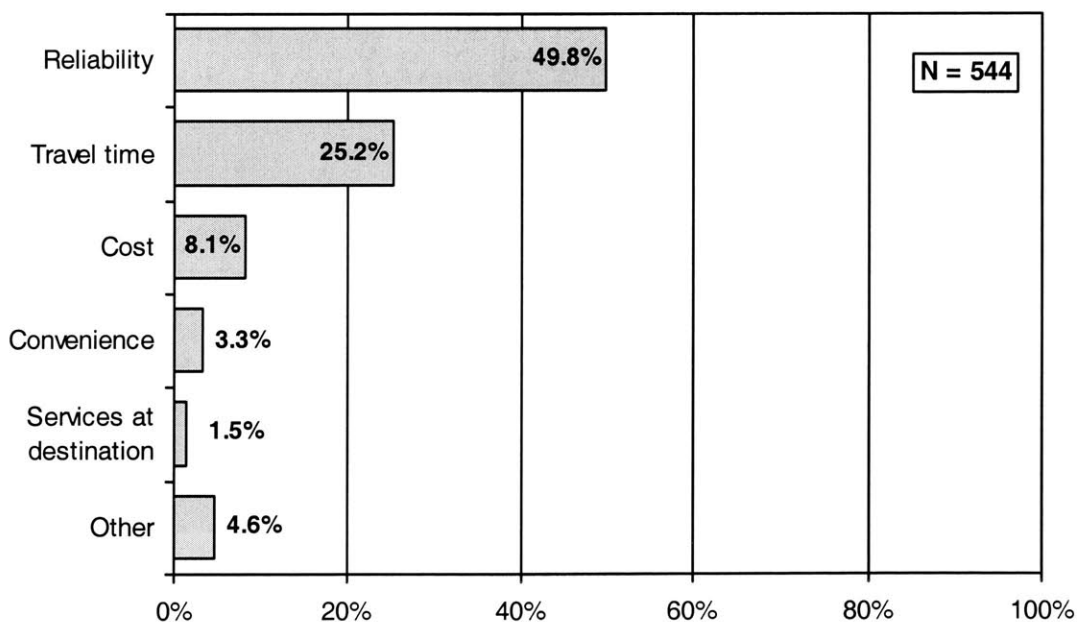


Figure 20: Q7 - For Business Trips: Factors That Become More Important

Costs unexpectedly became more important for a small percentage of business travelers. Some of these survey respondents indicated that their employers reimbursed for GA travel, but only up to the price of an airline ticket. The cost of traveling by GA versus commercial airline thus became important for their business travel decisions.

“Services at destination” is the only new category not already encountered in question 6. This category considers available services at the destination airport, including ground transportation. Other services were access to a phone, showers, and sleeping as well as entertainment and business conference facilities. Respondents appeared to be considering services at both commercial airports (such as “ambassador club” services from the airlines) as well as services at smaller general aviation airports.

Question 8: Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip (both business and personal/leisure).
(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 21, and each is briefly addressed below. “Other” responses included factors such as terrain being over-flown, stress of trip planning, safety, employer prohibitions against GA travel, and having to pass through customs during an international GA flight. En route weather, mode cost, travel distance and time ranked as top considerations in choosing among the various modes of travel. The issues of mobility at the destination and convenience of the travel mode also ranked highly among the considerations.

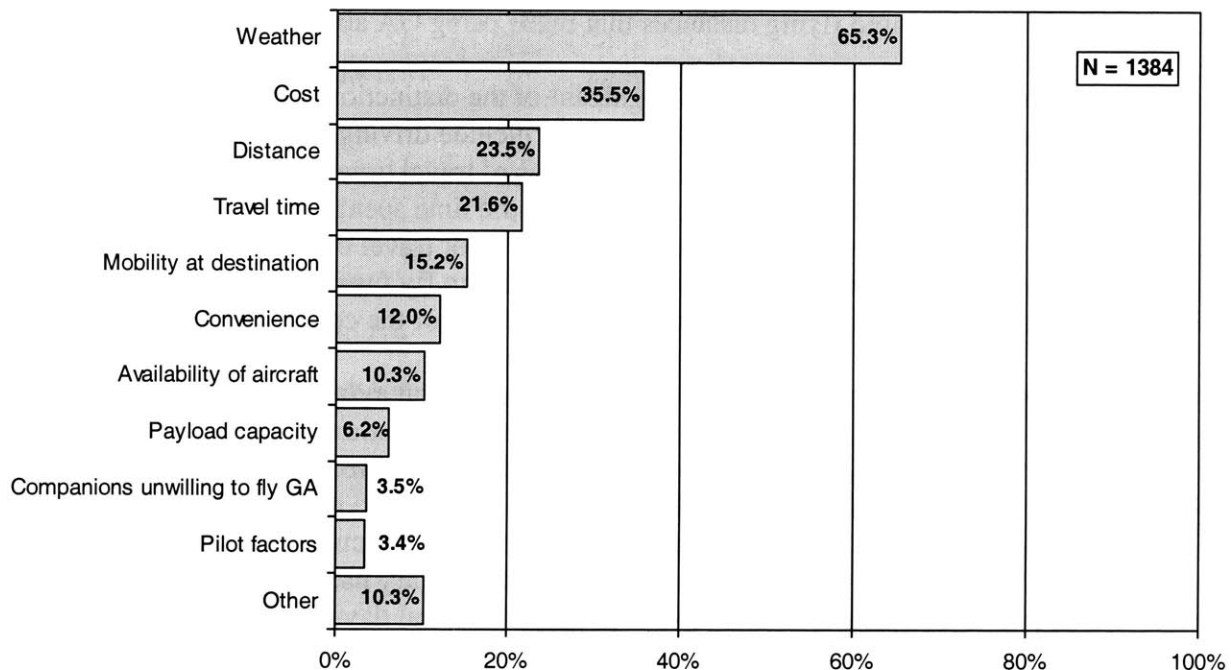


Figure 21: Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

Weather: As with question 6, specific types of weather such as thunderstorms and known icing were often cited as barring travel by GA aircraft. This category not only included prevailing weather, but also forecast weather over the duration of the trip. Some of those surveyed commented that although weather for the outbound leg of the trip was clear, weather threatening the return trip would also prevent them from flying on GA.

Cost: Issues similar to those cited for question 6 were included in this category. In addition, high rental costs were identified as another factor in this category, as well as discounted airfares to certain destinations with which GA travel could not compete. Costs appeared to be mainly associated with the rental or operational costs of the aircraft. Costs associated with training, maintaining proficiency or obtaining supplies (e.g. charts) were not specifically identified for this question. Costs were often placed within the context of trip distance, such as “over 1000 miles

airlines are cheaper” and “for less than 200 miles the car is cheaper.” Responses in this context were logged here under “cost” whereas the more ambiguous response “distance” was categorized separately. Responses to question 13 also ranked expense as an important factor in deciding to not travel by GA aircraft.

Distance: Any travel distance factors associated with travel time or costs (e.g. “over 500 nm is too slow in my GA aircraft” or “over 1000 miles airlines are cheaper”) were logged under the appropriate category (i.e. “travel time” or “cost”). Responses that indicated only distance as a decision factor (e.g. “If the distance is greater than 300nm I’ll fly commercial”) were logged under this “distance” category. It is conceivable that, if pressed for details, respondents may have associated their distance comments with travel costs or time, thereby increasing the relative importance of those two categories. Some survey respondents indicated that international or intercontinental travel required flying distances that made using GA aircraft impractical.

Travel time: Many survey respondents were cognizant of the distinction between en route travel time and total doorstep-to-destination time (which may include driving to the airport, checking baggage, etc.). Of those who specified one of these types of travel time, often the total doorstep-to-destination time was cited. At shorter travel distances the time spent in preflight planning and preparation for travel by general aviation caused some to favor travel by automobile. At longer distances some respondents noted that the airlines were able to fly faster than the GA aircraft available to them, so the total travel time was reduced in favor of the commercial airlines.

Mobility at destination: Poor ground transportation from a general aviation airport to the final destination was cited by 15.2% of those who responded to this question. A lack of access to public transportation (e.g. bus, rail, taxi) or rental cars was most often cited as a major reason for choosing an alternative mode of travel. Some survey participants also noted that rental cars at GA airports were often more expensive than those available at large commercial airports. The “courtesy car” that many GA airports make available for temporary use was not satisfactory for trips that required access to transportation overnight or for several days. Another concern cited by many was lack of access to transportation from GA airports after normal business hours and on weekends. The lack of mobility at GA airports favored using one’s own automobile for shorter trips and choosing to travel by commercial airline for longer trips (access to ground transportation being better at commercial airports). Responses to question 13 also reinforce the idea that ground transportation issues act as barriers to utilizing GA transportation. In addition, data from question 15 suggests that ready access to a car at the destination is a major advantage that traveling by automobile holds over GA travel.

Convenience: The factors cited under question 6 were also included in this category, such as ease of accessing GA travel and the effort involved with the travel (e.g. preflight planning on GA versus purchasing an airline ticket over the phone). Many respondents commented that a general aviation airport was located conveniently near their own residence but was sometimes not located near their destination. This, coupled with a lack of mobility at the destination, combined to make general aviation travel less accessible than travel by automobile or commercial airline. Convenience responses did rank rather low for this question, perhaps suggesting that, although an important consideration (question 6), it is not a frequent factor in actually choosing against GA aircraft for any given trip. This would be consistent with the results seen under question 13

where convenience is an important factor in the decision process, but only an occasional factor in the final decision to not utilize GA travel.

Availability of aircraft: As in question 6, this category included not being able to access a GA aircraft for travel due to mechanical difficulties, scheduling conflicts with other share owners or lack of available aircraft to rent at a local FBO. Also included was unavailability of an aircraft for extended travel periods and overnight stays.

Payload capacity: Some respondents indicated that a lack of payload capacity was a major factor in their choosing to not travel by GA aircraft. This category included cargo restrictions in both weight and volume as well as passenger restrictions. Automobiles were typically cited as being superior in their cargo carrying capacity as well as the lack of weight and loading (i.e. center of gravity) concerns. An additional factor was that the number of traveling companions on a trip might put the aircraft over weight, limit useful range of the aircraft, or that the number of travelers was restricted by the cabin size of the aircraft. Some respondents commented that automobiles are less limited for these considerations and the option to use a larger vehicle (e.g. van) is more readily available and affordable than the option to use a larger aircraft. The commercial airlines are, in practical terms, essentially unlimited in the number of passengers that may travel together. The responses from question 15 indicate that payload capacity is an advantage that the automobile holds over travel by GA aircraft.

Companions unwilling to fly GA: In some cases the fact that a spouse, child, or other traveling companion was unwilling to fly by GA aircraft presented a major reason for choosing an alternative mode of travel. In most cases the survey participant wrote something similar to “My wife/son/boss hates to fly in my little plane.” In some cases it was simply stated that traveling companions preferred the comfort of airline travel. Although “Safety” was categorized separately and did not receive responses totaling over 1% to be shown as a separate category, some survey participants did indicate that their traveling companions were unwilling to fly on GA aircraft due to perceived safety concerns.

Pilot factors: Some survey participants indicated that their own fatigue, stress levels or lack of piloting currency or proficiency were major reasons for choosing not to travel by GA aircraft on any given trip. These factors included business or family concerns that would act as distractions to safe piloting, personal health (e.g. a cold), night flight after a tiring day of work, and lack of IFR proficiency. Some also cited conditions exceeding their personal limitations (e.g. gust speeds, weather conditions, trip distance) as reasons for choosing an alternative mode of travel.

For aircraft owners, cost was less frequently mentioned as a factor in choosing to not travel by GA aircraft (20.2%). For aircraft renters, Figure 22 indicates that cost was elevated over weather in being mentioned as a factor (59.3%).

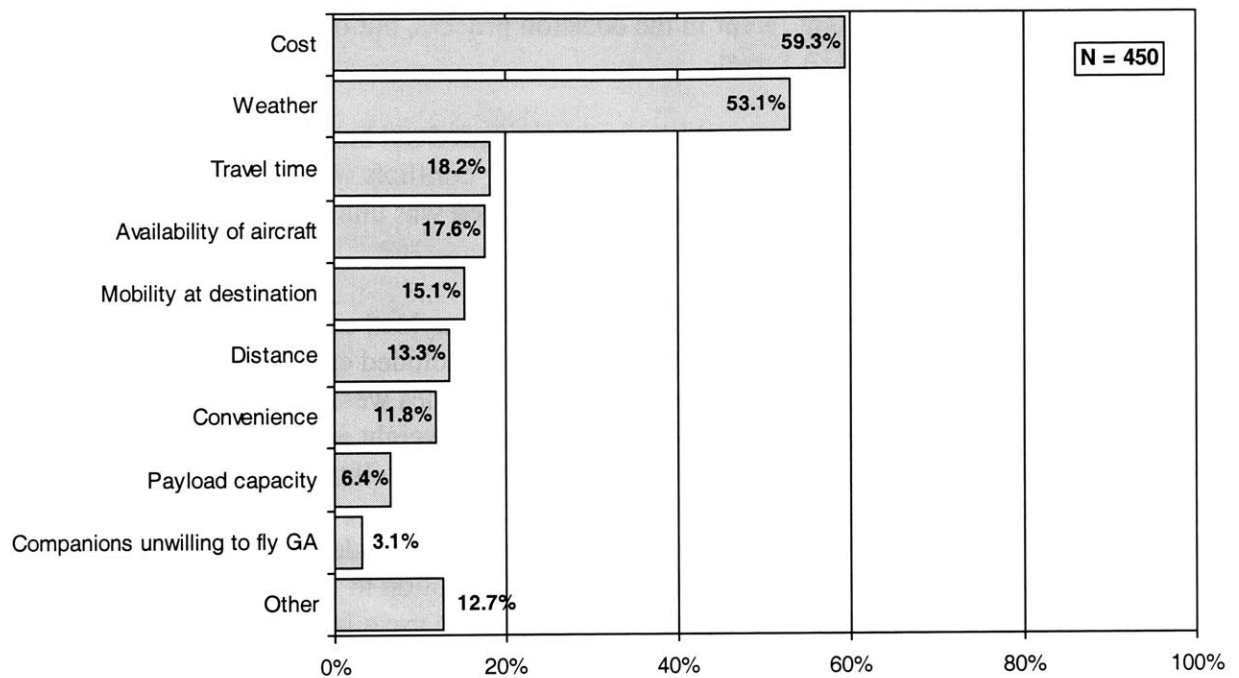


Figure 22: Q8 – (Renters) Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

Question 9: Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Does not apply (self-employed, retired, etc.)

One-half of survey participants indicated that their employer did not have a policy explicitly prohibiting them from traveling on GA aircraft (Figure 23). It is worth noting that this question only examined explicit prohibitions, whereas some responses from question 8 suggest that implicit prohibitions may also be acting as barriers to using GA for business. Expense policies such as not reimbursing for GA travel or reimbursing only up to costs of airline travel may prevent fuller utilization of GA aircraft for business travel.

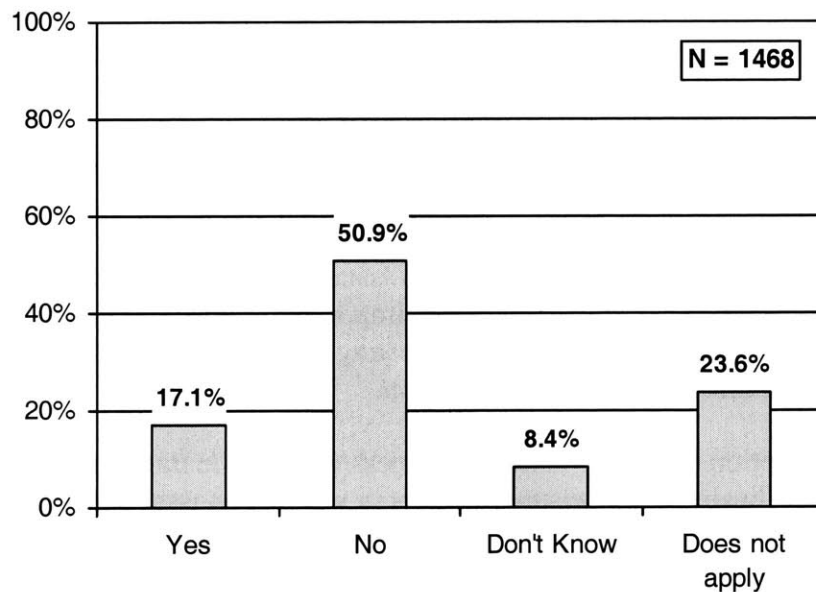


Figure 23: Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

***Question 10a:** For a business trip, how important to you are the following issues in choosing your mode of travel (e.g. car, bus, airline, GA)?*

***Question 10b:** For a leisure/personal trip, how important to you are the following issues in choosing your mode of travel (e.g. car, bus, airline, GA)?*

	Not Important	Somewhat Important	Very Important
Expense (cash outlay)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doorstep-to-destination travel time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort level (e.g. noise, space constraints, temperature)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The fun/pleasure of the travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility (e.g. the ability to alter departure time, alter destination)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability (e.g. getting to the destination at the time you planned)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal privacy (e.g. ability to hold a private conversation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to conduct business/work while traveling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobility at destination (e.g. access to a car)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The responses from these two questions were grouped into two categories: “Not important” and “Important” with the second category combining the responses “Somewhat Important” and “Very Important.” This better facilitated the determination as to whether an issue was important overall. If so, then the relative importance of that issue could be determined by examining how many survey respondents answered “Somewhat Important” versus “Very Important.” The answers to questions 10a and 10b are most interesting when compared to each other, and therefore will be examined together in this section.

With only one exception (ability to conduct business/work while traveling) there was a strong correlation between business and leisure travelers in whether an issue was judged important or not important. The only difference was typically in the degree of importance of the issue. There was no significant change in responses among heavy GA users and heavy airline users, as defined previously in Section 2.2.3.

Flexibility, Safety, Mobility at destination: All three of these issues rated as important in over 90% of the responses for both business and leisure/personal travel. In addition, these issues all rated as “very important” to over half of those indicating that they were important issues. For the issue of safety, over 75% of both business and leisure/personal travelers who felt it was important rated it as “very important” (Figure 27). This is the only area of the survey in which safety rated such a strong response. This may indicate that safety is an issue that is assumed inherent in the three most frequently considered modes of travel (auto, airline and GA, see question 5) and is therefore not consciously considered in most cases (i.e. it would not typically be mentioned in a free-form response to a question about major issues). However, when explicitly asked if it is an important issue, it is rated highly.

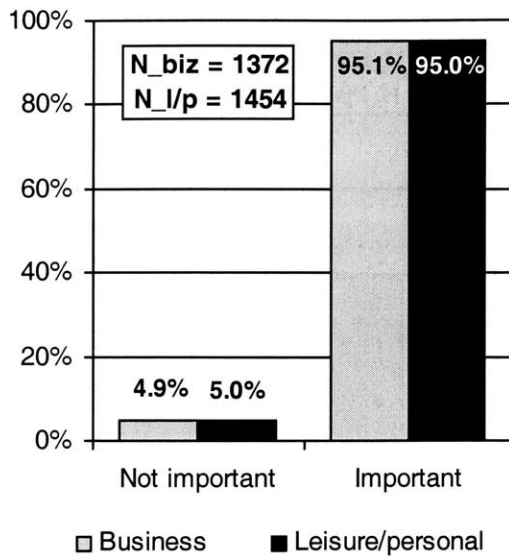


Figure 24: Q10 – (Flexibility) How important to you are the following issues in choosing your mode of travel?

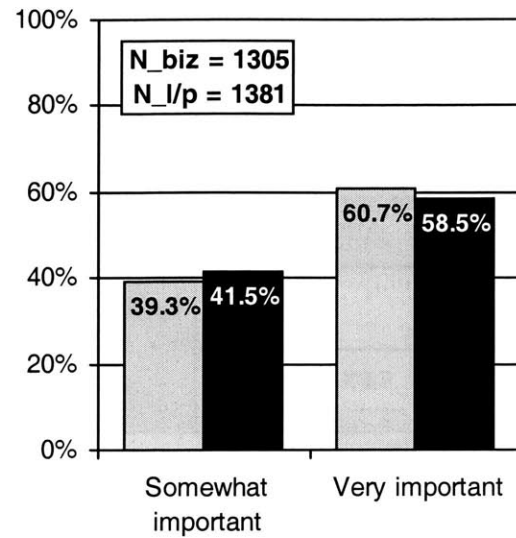


Figure 25: Q10 – (Flexibility) Of those who rated the issue “important,” the degree to which they considered it important

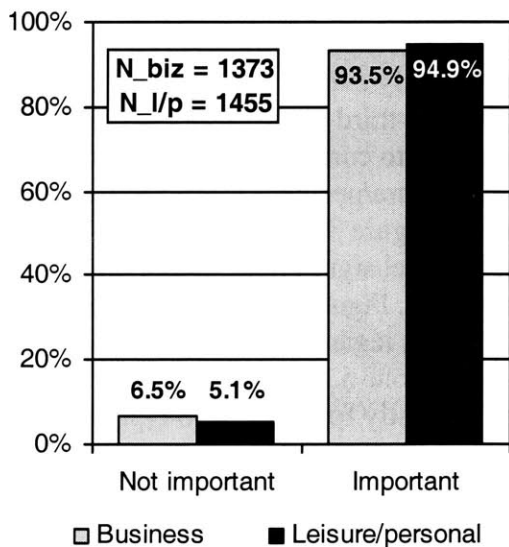


Figure 26: Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

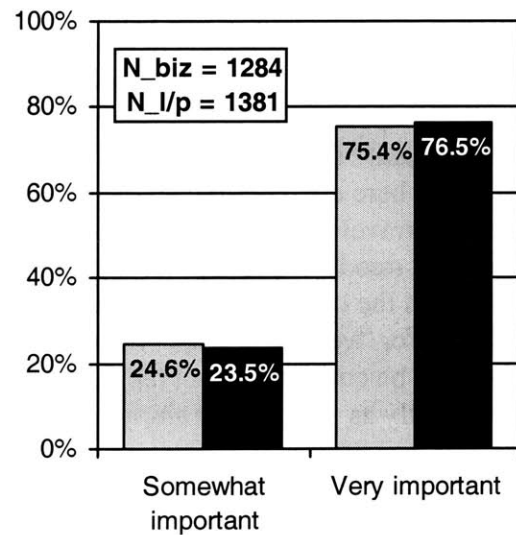


Figure 27: Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

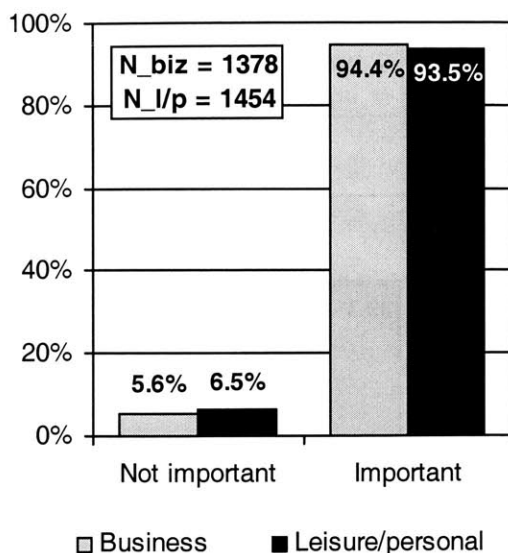


Figure 28: Q10 – (Mobility) How important to you are the following issues in choosing your mode of travel?

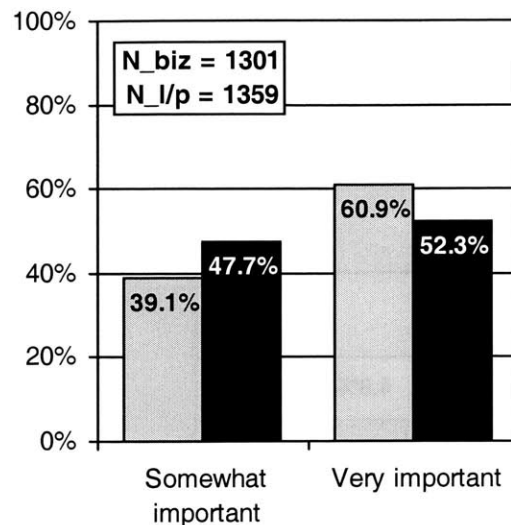


Figure 29: Q10 – (Mobility) Of those who rated the issue “important,” the degree to which they considered it important

Expense: The issue of the expense of the travel mode was rated as important for over 80% of those who responded to these questions for both business and leisure/personal travel (Figure 30). However, the degree of the importance was mixed, with a nearly even split between “somewhat” and “very” important for leisure/personal travel and under one-third of the responses rating it as “very important” for business travel (Figure 31). This appears to corroborate the responses from question 7 where costs were generally more important for leisure/personal travel, conceivably because the traveler is then paying for the trip. As shown in Figure 32, those who typically rent their aircraft rated expense as “very important” for leisure travel significantly more often (63.6%) than the overall survey population (46%). Conversely, Figure 33 shows that expense rated lower for “very important” responses for aircraft owners, regardless of trip purpose. This continues to be consistent with the pattern developed in questions 6 and 8 where costs appeared less frequently as a factor for aircraft owners and more frequently for those who typically rent their aircraft.

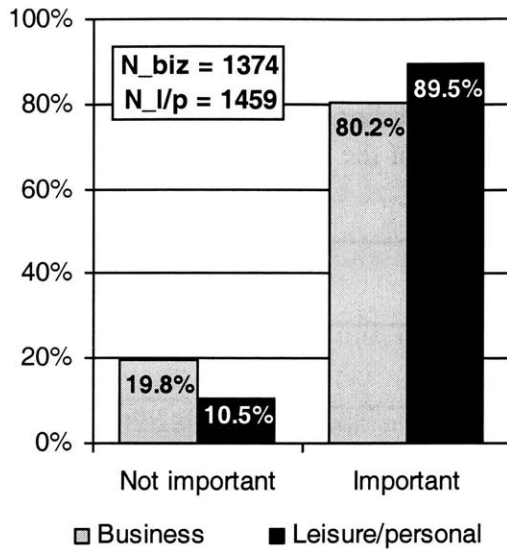


Figure 30: Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

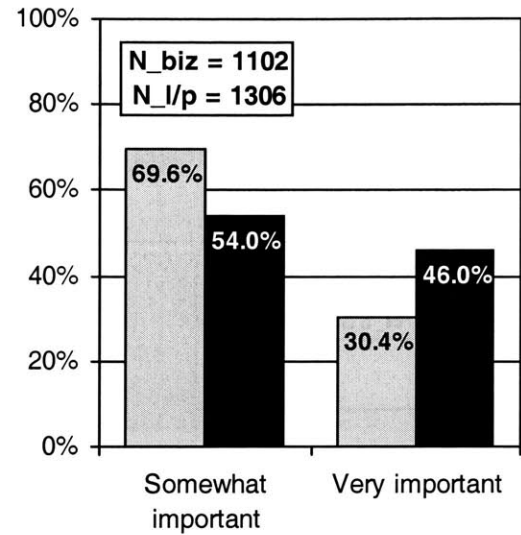


Figure 31: Q10 – (Expense) Of those who rated the issue “important,” the degree to which they considered it important

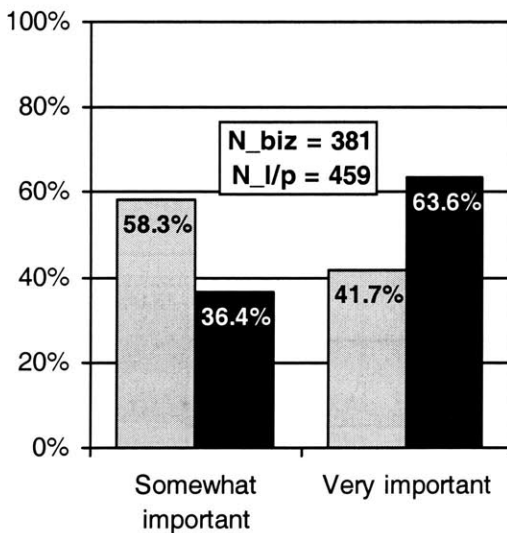


Figure 32: Q10 – (Expense - Renters) Of those who rated the issue “important,” the degree to which they considered it important

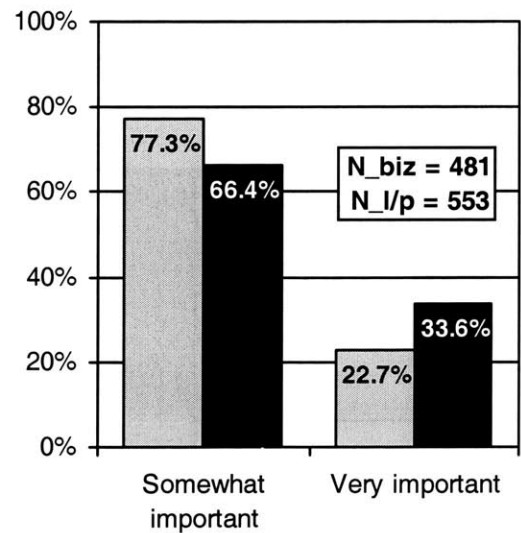


Figure 33: Q10 – (Expense - Owners) Of those who rated the issue “important,” the degree to which they considered it important

Doorstep-to-destination travel time, Reliability: Both of these issues rated highly as important issues for both business and leisure/personal trips (Figure 34 and Figure 36). In degree of importance, however, both issues rated as more important for business travel than for leisure travel (Figure 35 and Figure 37). This same pattern was seen earlier in question 7, reaffirming that these two issues are of greater concern when the purpose of the trip is for business.

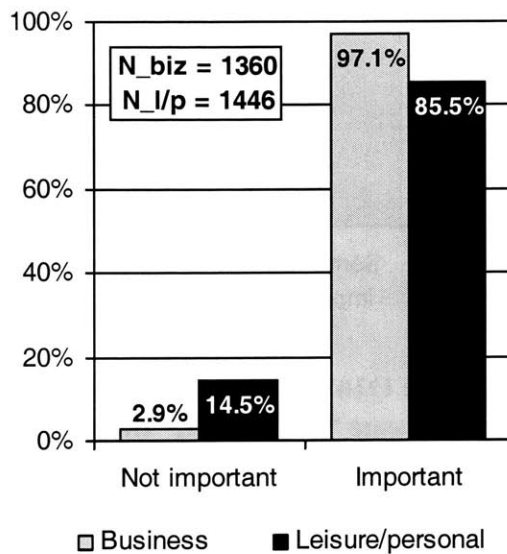


Figure 34: Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

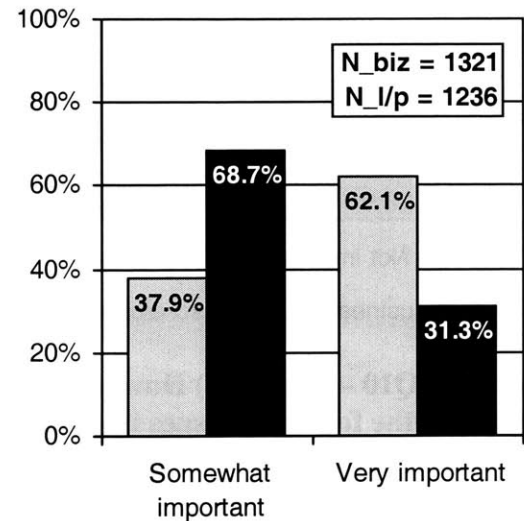


Figure 35: Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

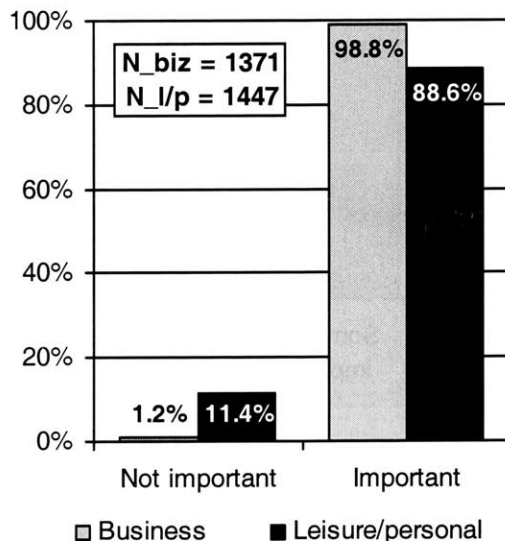


Figure 36: Q10 – (Reliability) How important to you are the following issues in choosing your mode of travel?

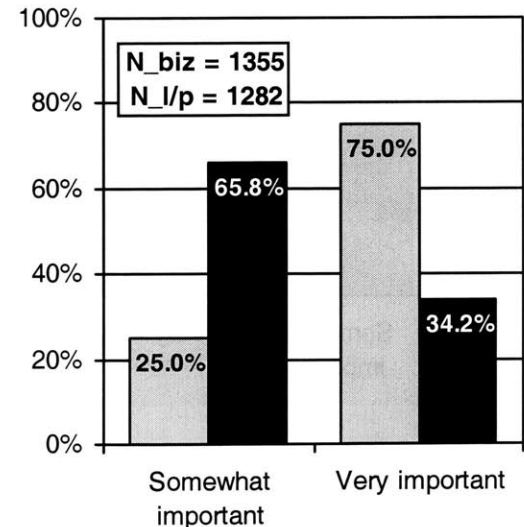


Figure 37: Q10 – (Reliability) Of those who rated the issue “important,” the degree to which they considered it important

Fun/pleasure of the travel: This issue was highly rated as important for both purposes of travel (Figure 38), but was rated more often as “very important” for leisure/personal travel (Figure 39). Although many business travelers consider the pleasure of the travel mode as important, one would expect the “fun factor” to be of most importance to the leisure traveler as shown here.

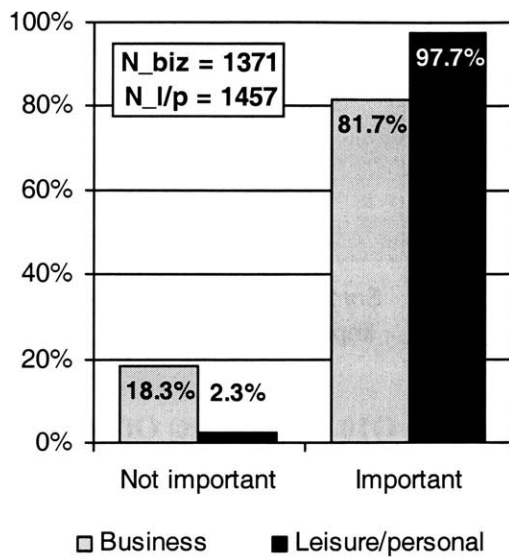


Figure 38: Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

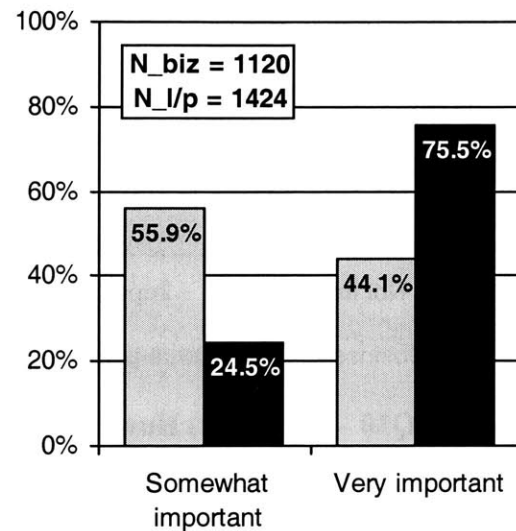


Figure 39: Q10 – (Fun) Of those who rated the issue “important,” the degree to which they considered it important

Comfort level: The comfort of the travel mode was rated as “somewhat important” by most of those who responded to this question (Figure 40 and Figure 41). It was seen in several of the responses to question 8 that some traveling companions influence travel mode decisions based on comfort of the mode as well (“companions unwilling to fly GA”).

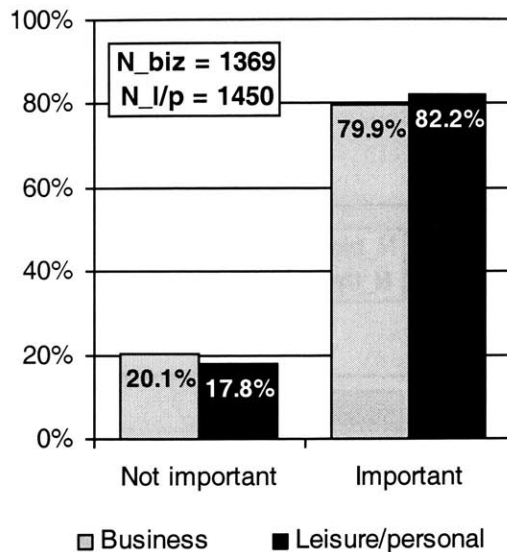


Figure 40: Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

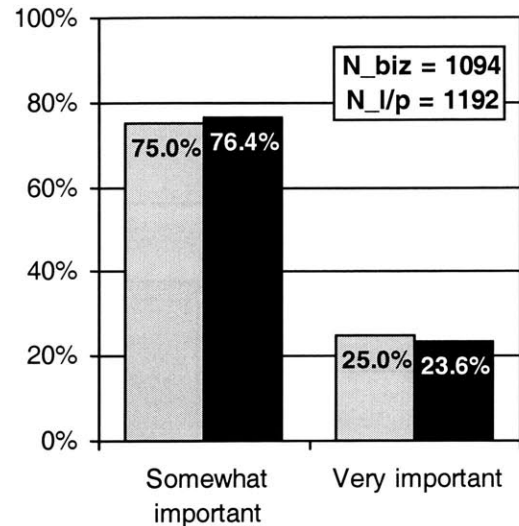


Figure 41: Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

Ability to conduct business, Personal privacy: Both of these issues were frequently rated as “not important” (Figure 42 and Figure 44). Furthermore, of those who did rate the issues as important, more than 75% rated personal privacy as only “somewhat important” (Figure 45) and over 80% rated the ability to conduct business as “somewhat important” (Figure 43). It is interesting to note that, with the emergence of cell phones, air phones and other means of keeping the business traveler in touch while away from home, nearly two-thirds of those who participated in this survey consider the ability to conduct business or work while traveling as unimportant to their travel mode choice.

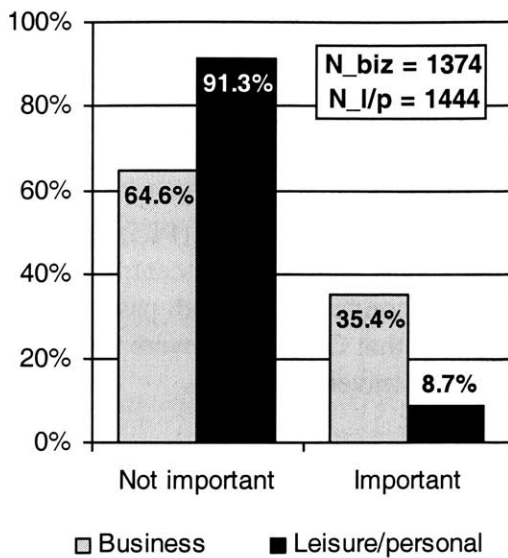


Figure 42: Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

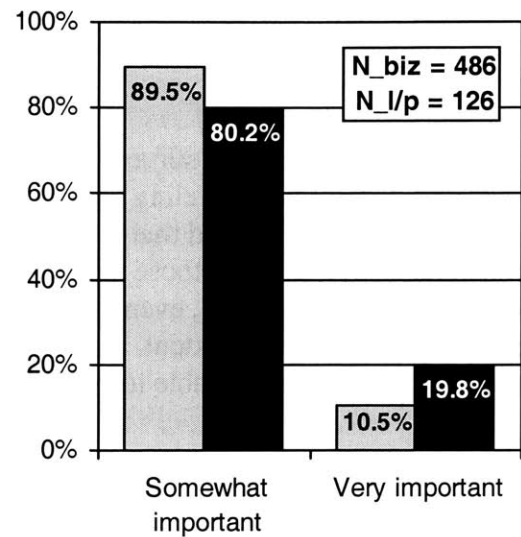


Figure 43: Q10 – (Conduct Business) Of those who rated the issue “important,” the degree to which they considered it important

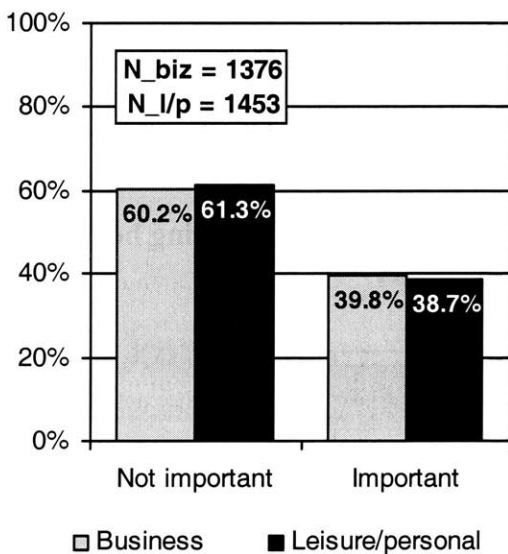


Figure 44: Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

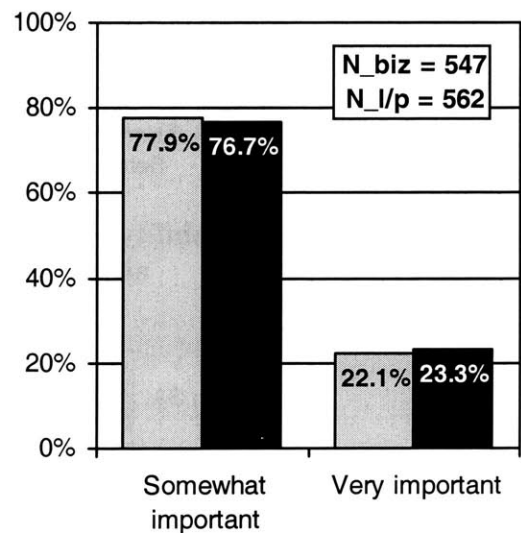


Figure 45: Q10 – (Privacy) Of those who rated the issue “important,” the degree to which they considered it important

Question 11: *Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft? Why?*
(free form response)

By an overwhelming margin survey participants indicated that their ability to conduct business or work was better when traveling on an airline (Figure 46). Of those who responded that this was the case, 81.3% indicated that it was because they were pilot-in-command (PIC) on the GA aircraft (Figure 47). Most of those surveyed indicated that they preferred to concentrate only on flying the airplane while PIC, even to the extent that business conversations with passengers were excluded. To a lesser extent, some participants indicated that GA aircraft were too noisy, cramped or otherwise unsuitable to conducting business while traveling.

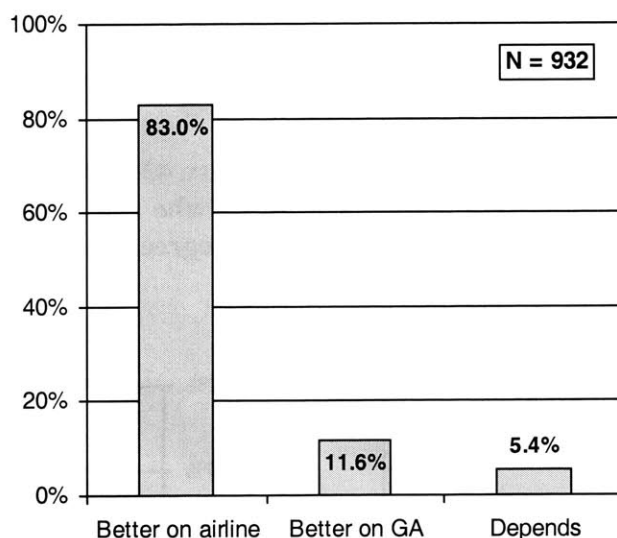


Figure 46: Q11 - Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft?

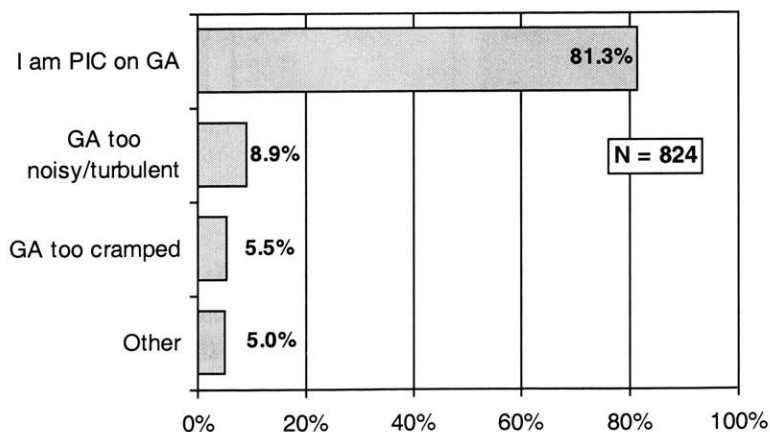


Figure 47: Q11 - Ability to work is better on airline because...

Of the minority who indicated that their ability to conduct business was better on a GA aircraft, responses were split between the airline being too cramped for work (often indicated as work on a laptop computer), less privacy available on an airline, and more flexibility being available while traveling by GA aircraft (Figure 48). This last comment regarding flexibility includes the ability to change travel schedule and destinations on short notice, even while en route. This indicates that at least a few survey participants interpreted a “better” ability to conduct business while traveling as including their “effectiveness” in conducting business. These respondents indicated that traveling via GA aircraft gave them the ability to meet more business clients over a given time interval and to better respond to changing business conditions by altering destination or schedule while traveling. Many of these same respondents still indicated that they did not conduct business while actually flying the aircraft.

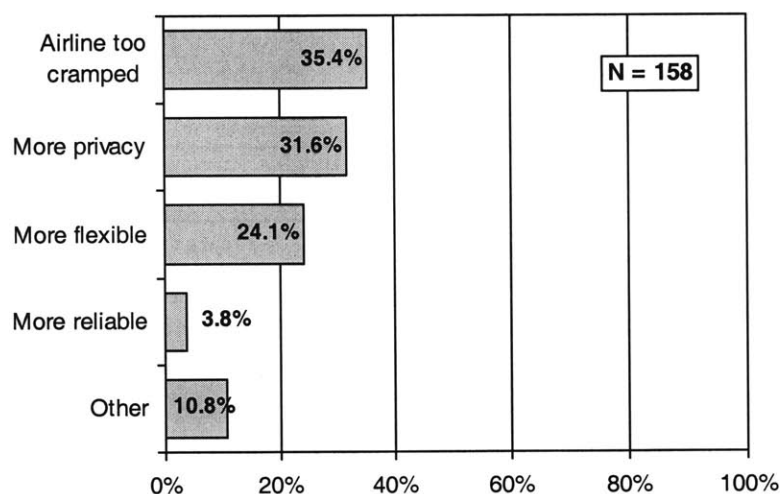


Figure 48: Q11 - Ability to work is better on GA because...

Note that question 10 indicated that the ability to conduct business or work while traveling was considered “not important” by most of those who participated in the survey.

Question 12: *Over the last 5 years estimate the number of trips you have considered making by GA aircraft.*

(free form response)

The mathematical mean of the collected data, shown in Figure 49, is 96.2 trips while the median is 40 trips. Although it is not clear from the way the data is shown in the figure, there are outliers at the high end that are increasing the mean and misrepresenting the typical survey respondent's number of trips. In isolation this data is not of particular interest for the purposes of this research. The statistics were compiled to use in conjunction with question 13, sorting responses by how often those who were surveyed considered using GA as their mode of travel. Sorting responses to question 13 by those who frequently and infrequently considered GA travel, however, did not reveal any significant deviations from the overall survey population. Of more interest were differences in question 13 responses indicated by using the alternate results sortings discussed in Section 2.2.3.

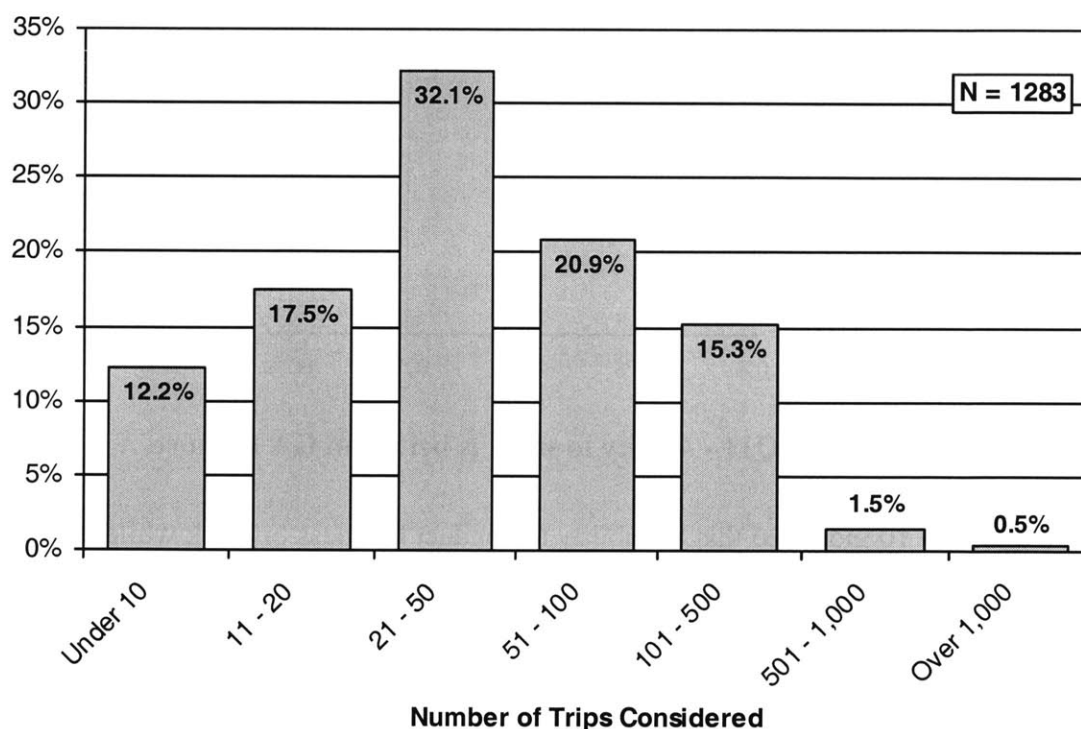


Figure 49: Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

Question 13: Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft:

	No Factor	Occasional Factor	A Factor	Frequent Factor
IFR weather	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Severe weather (e.g. icing, thunderstorms)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aircraft mechanical problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routine aircraft maintenance is not up to date	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not legally current as a pilot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concern regarding proficiency level of pilot (e.g. partial panel skills, night IFR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel companions are unwilling to fly GA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort of GA travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aircraft scheduling issues (e.g. unavailable due to conflicts with other owners, aircraft was not available over night)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speed (alternative travel modes were faster)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost (alternative travel modes were less expensive)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenience (alternative travel modes were more easily utilized)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airspace congestion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of service facilities at destination or en route airports (e.g. food, toilet, phone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of mobility while at destination (e.g. access to other transportation modes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insurance restrictions (e.g. minimum pilot qualifications for aircraft)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insurance costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The responses to question 13 were grouped into two categories: “No Factor” and “Factor” with the second category combining the responses “Occasional Factor,” “A Factor” and “Frequent Factor.” This better facilitated the determination as to whether an issue factored into decisions overall. If so, then the relative frequency of how often that issue factored into decisions could be determined by examining how many survey respondents answered “Occasional Factor,” “A Factor” or “Frequent Factor.”

Top rated issues were weather (both IFR weather and severe weather), cost, speed and convenience, and a lack of mobility at the destination.

IFR weather, Severe weather: These two issues were the highest rated for being factors in the decision to not travel by GA aircraft (Figure 50 and Figure 52). Of those who indicated that weather of some type factored into their decisions, the frequency of how often was nearly evenly split between “occasional factor,” “a factor” and “frequent factor” (Figure 51 and Figure 53).

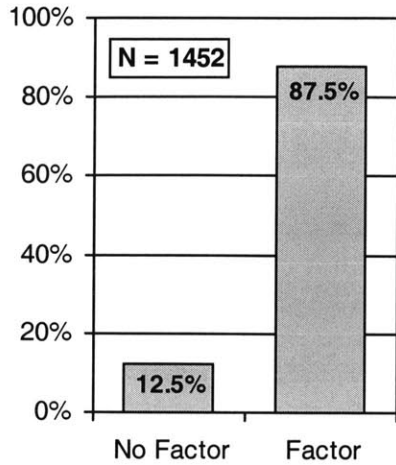


Figure 50: Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

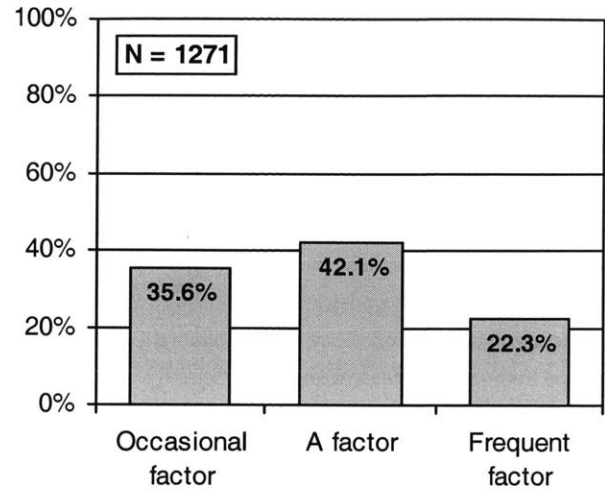


Figure 51: Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

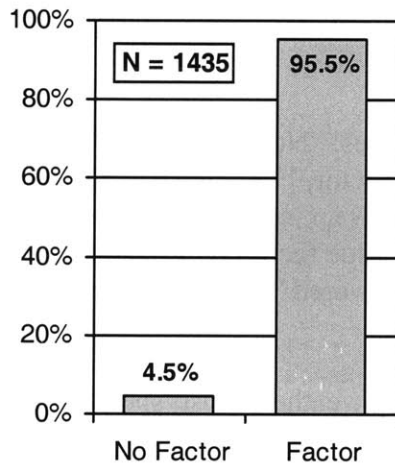


Figure 52: Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

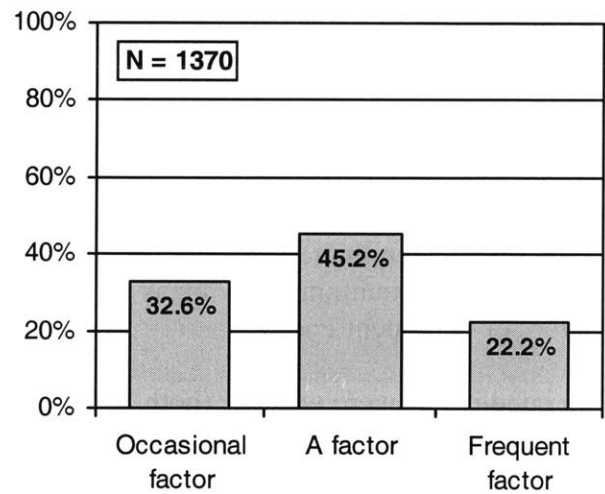


Figure 53: Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Aircraft mechanical problems: Over one-third of survey participants rated mechanical problems as not being a factor in their decisions to not travel by GA aircraft (Figure 54). Of those who did rate it as a factor, 79% felt that it was only an “occasional factor” (Figure 55).

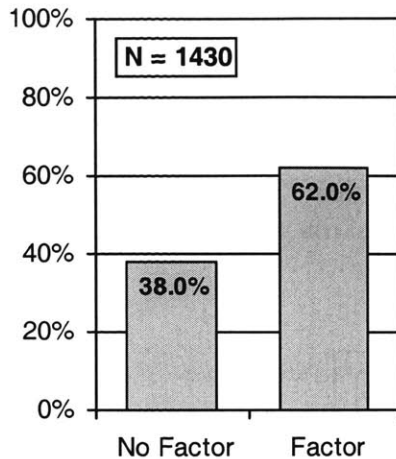


Figure 54: Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

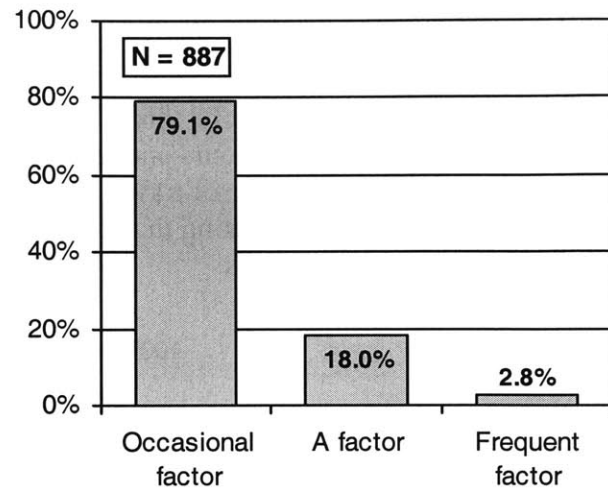


Figure 55: Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Routine aircraft maintenance is not up to date: Seventy-three percent of survey respondents indicated that this issue was “no factor” in their decisions to not travel by GA aircraft (Figure 56). Of those who did indicate it as a factor, nearly 78% indicated that it was only an “occasional factor” (Figure 57).

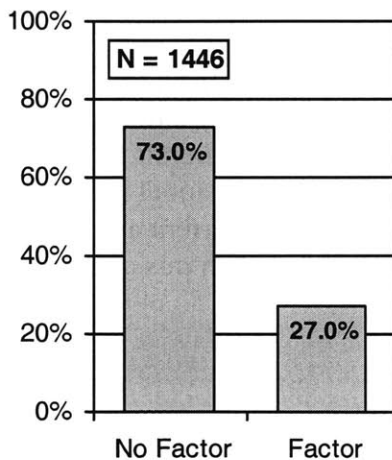


Figure 56: Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

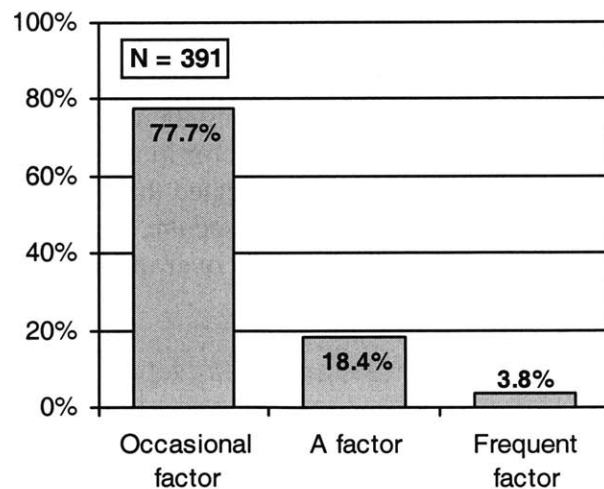


Figure 57: Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Not legally current as a pilot: This issue was rated as “no factor” by nearly 86% of those answering the question (Figure 58). In the comments section at the end of the survey several pilots expressed concern that their answer “no factor” to this item, as well as the proficiency level (next item in the list) not be misinterpreted. They clarified that “no factor” indicated that they maintained their flying hours and skills on a regular basis such that they did not become factors in choosing their mode of travel. This is in contrast to their “no factor” response possibly being misinterpreted as indicating that if their flight hours or skills were deficient they might act as PIC for the flight regardless.

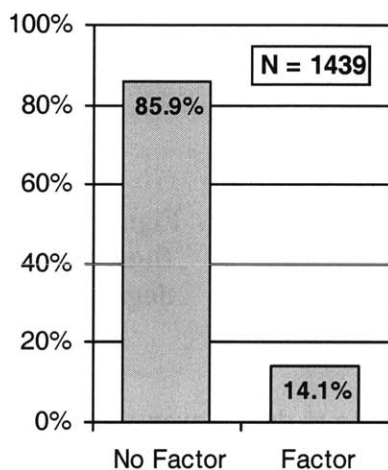


Figure 58: Q13 – (Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

Concern regarding proficiency level of a pilot: About half of those answering this question indicated that concern regarding their partial panel skills, night IFR ability and other pilot proficiency issues played a factor in their decisions to not travel by GA aircraft (Figure 59). Seventy percent of those indicated that these issues only played an “occasional factor” in their decisions (Figure 60). Please see the comments under the “Not legally current as a pilot” item above regarding pilot concern over misinterpreting a “no factor” rating on this question.

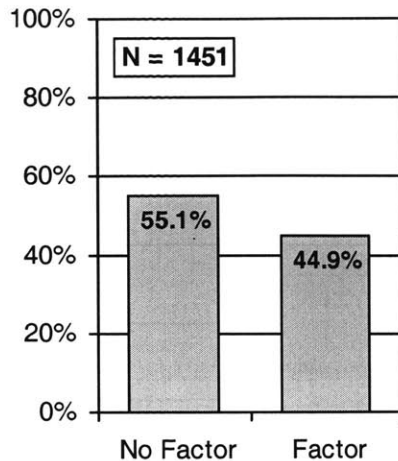


Figure 59: Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

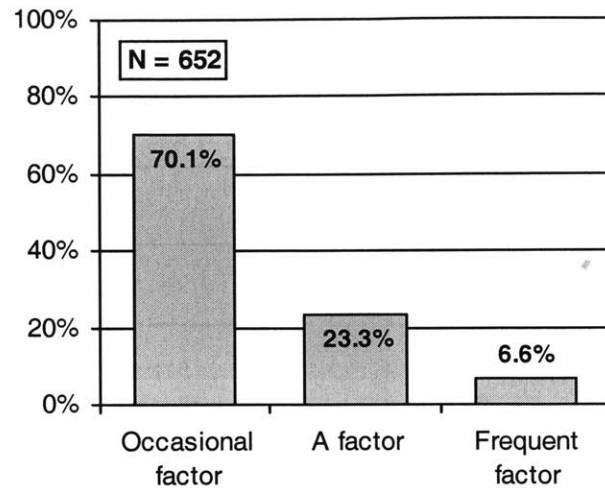


Figure 60: Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Travel companions are unwilling to fly GA: Slightly over one-third of those who answered this question indicated that traveling companions’ unwillingness to fly on GA aircraft factored into their decisions to not travel by GA aircraft (Figure 61). Of those who said the issue was a factor, 67.3% indicated that it was only an occasional factor (Figure 62). This appears to be consistent with the relatively low rankings of this issue in questions 6 and 8.

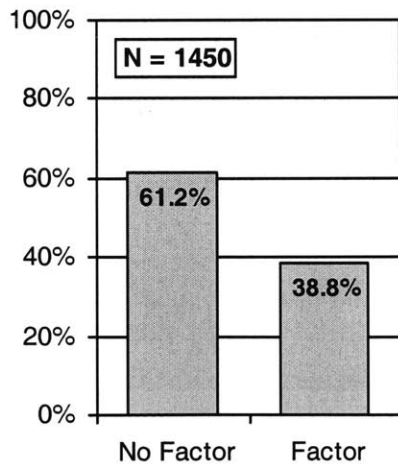


Figure 61: Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

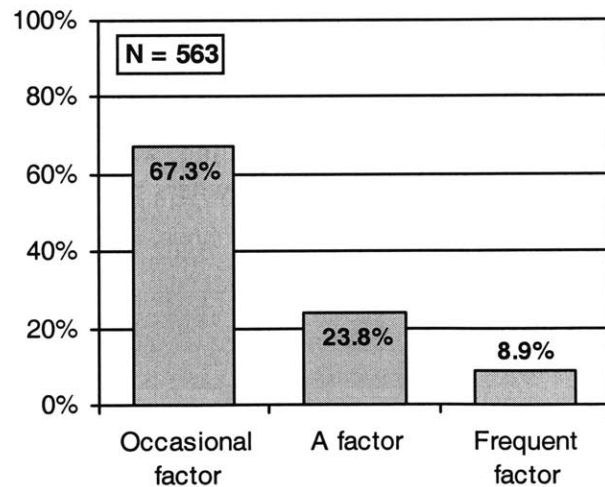


Figure 62: Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Comfort of GA travel: This issue was not ranked as particularly important in deciding not to travel by GA aircraft (Figure 63). Of the 30% who indicated that the comfort of GA travel was a factor, almost 73% indicated that it was only an “occasional factor” (Figure 64).

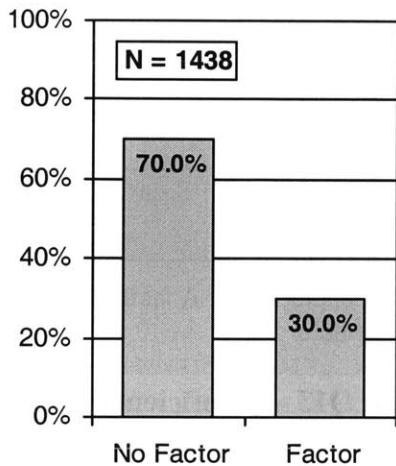


Figure 63: Q13 – (Comfort) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

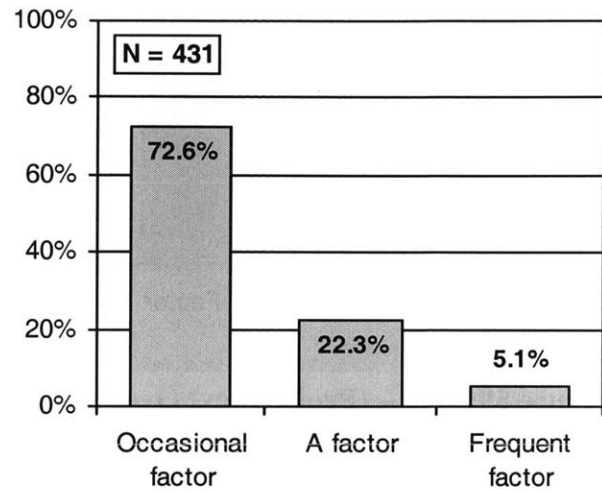


Figure 64: Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Aircraft scheduling issues: Almost one-half of those answering this question indicated that scheduling issues were a factor in their decisions to not travel by GA aircraft, with 54.4% of those people indicating that it was an “occasional factor” for them (Figure 65 and Figure 66). This is consistent with the relatively low, but not insignificant rankings of this issue in questions 6 and 8. Responses from aircraft renters as compared to aircraft owners were dramatically different on this issue. As one might expect, those who typically rent their aircraft reported more problems with aircraft scheduling, with 82.5% indicating that it was a factor (Figure 67). Conversely, 89% of aircraft owners rated scheduling issues as “no factor” (Figure 68).

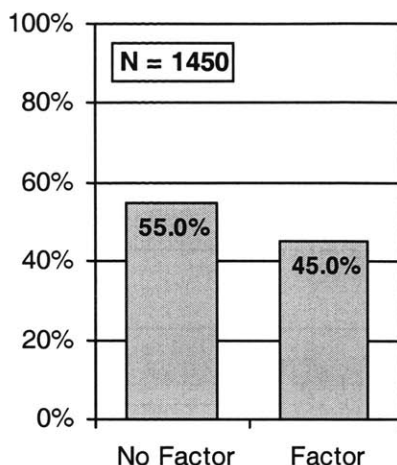


Figure 65: Q13 – (Scheduling) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

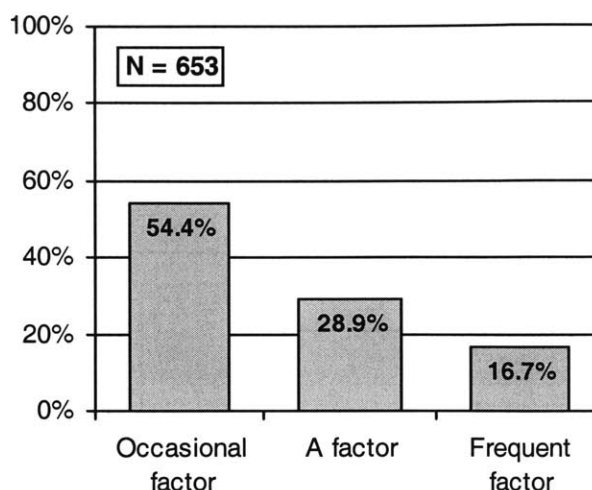


Figure 66: Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

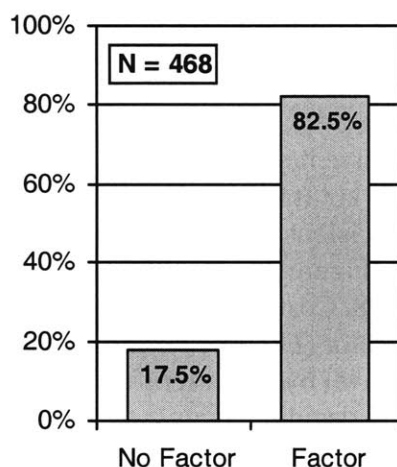


Figure 67: Q13 – (Scheduling - Renters) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

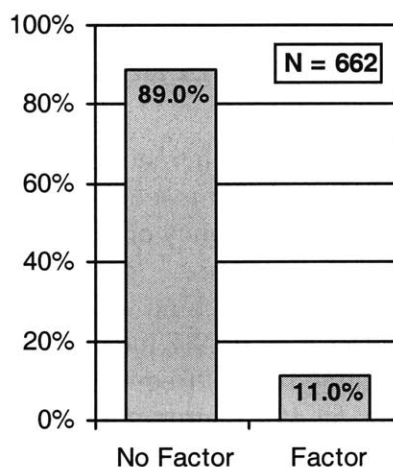


Figure 68: Q13 – (Scheduling - Owners) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

Speed: Along with convenience, this issue ranked as the third highest for being a factor in deciding to not travel by GA aircraft (Figure 69). The frequency of the issue factoring into decisions was split between “occasional factor” and “a factor” with few responses to “frequent factor” (Figure 70). Travel time, which may be equated in many instances with speed of the transportation mode, was rated highly in question 6 regarding its importance in choosing between travel modes. In question 8, travel time was of slightly less importance in choosing

against GA travel. This is consistent with the results seen here where speed is highly rated as a factor in the decision process, though not necessarily a frequent factor in deciding to not travel by GA aircraft.

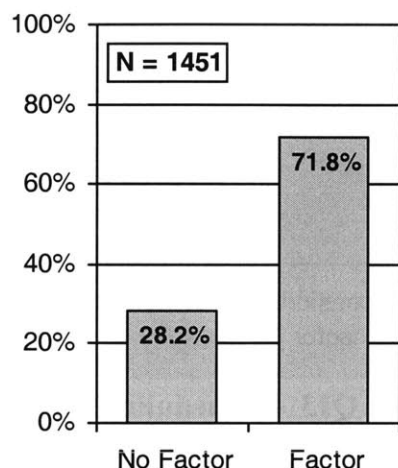


Figure 69: Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

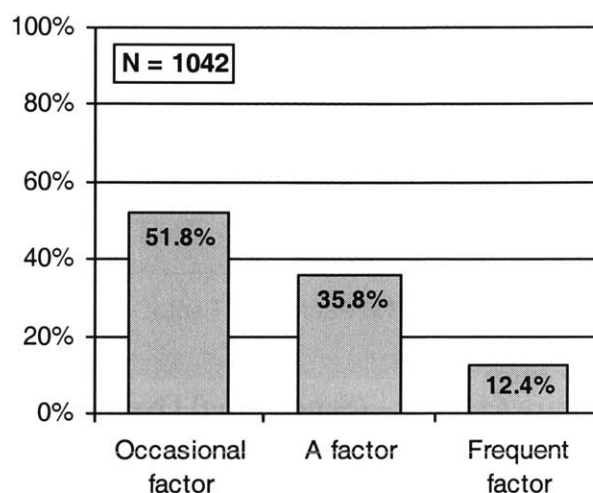


Figure 70: Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Cost: The fact that an alternative travel mode was less expensive ranked second (weather ranked first, see above) as the most highly rated factor in deciding to not travel by GA aircraft (Figure 71). The frequency of this item playing a factor in decisions was essentially evenly split among “occasional factor,” “a factor” and “frequent factor” (Figure 72). This is consistent with costs ranking second behind weather in both questions 6 and 8. Cost was elevated as an issue by aircraft renters with 91.9% indicating cost as some type of factor (Figure 73), and 44.3% of those responses rating it as a “frequent factor” in deciding to not travel by GA aircraft (Figure 74). In comparison, 64.4% of aircraft owners rated cost as a factor in deciding against travel by GA aircraft (Figure 75), but with only 10.9% of those responses citing cost as a “frequent factor” (Figure 76).

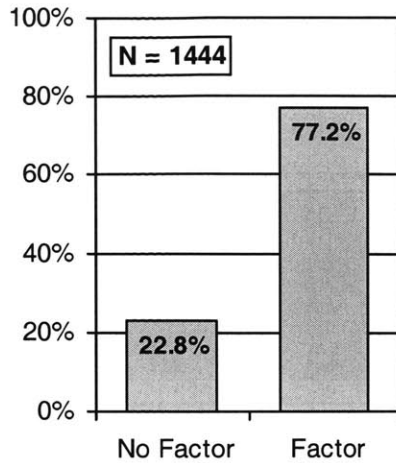


Figure 71: Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

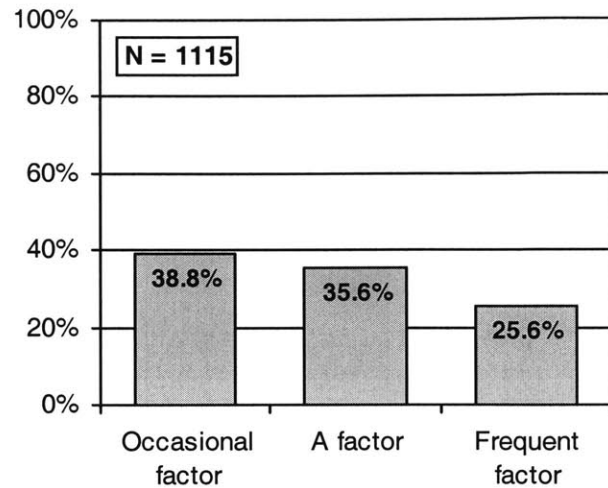


Figure 72: Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

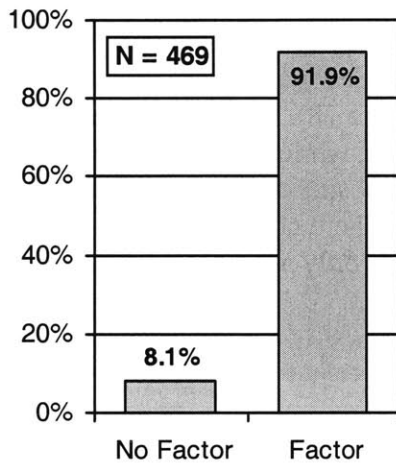


Figure 73: Q13 – (Cost - Renters) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

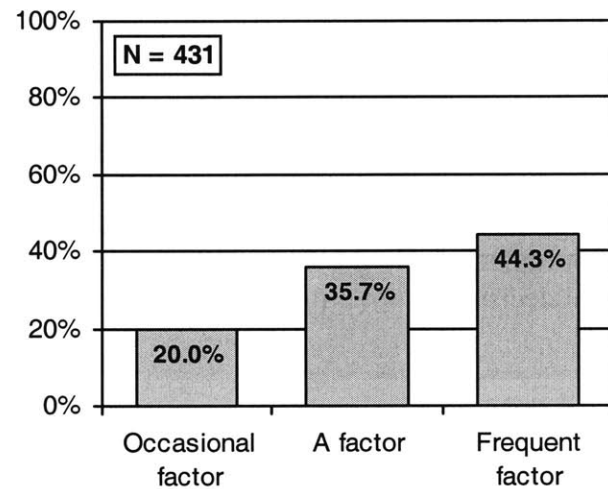


Figure 74: Q13 – (Cost - Renters) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

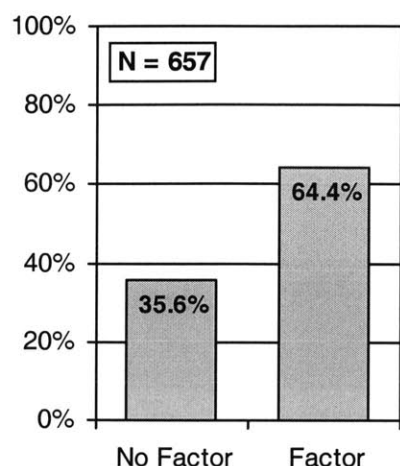


Figure 75: Q13 – (Cost - Owners) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

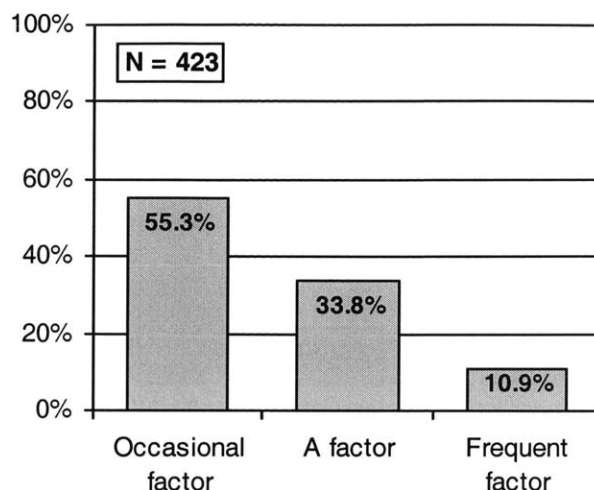


Figure 76: Q13 – (Cost - Owners) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Convenience: Along with speed, this issue ranked as the third highest for being a factor in deciding to not travel by GA aircraft (Figure 77). The frequency of the issue was largely split between those answering “occasional factor” and “a factor.” Few participants rated the issue as a “frequent factor” in their decisions to not travel by GA (Figure 78). Convenience was highly rated in question 6 as being a factor in choosing travel modes, while responses to question 8 indicated that it was not a particularly important factor in choosing against GA transportation for any given trip. This is consistent with the results seen here, where convenience is seen as an important factor in the decision process, but for the most part only an occasional factor in the final decision to not utilize GA travel.

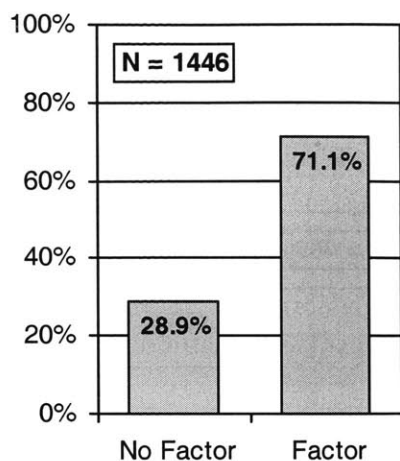


Figure 77: Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

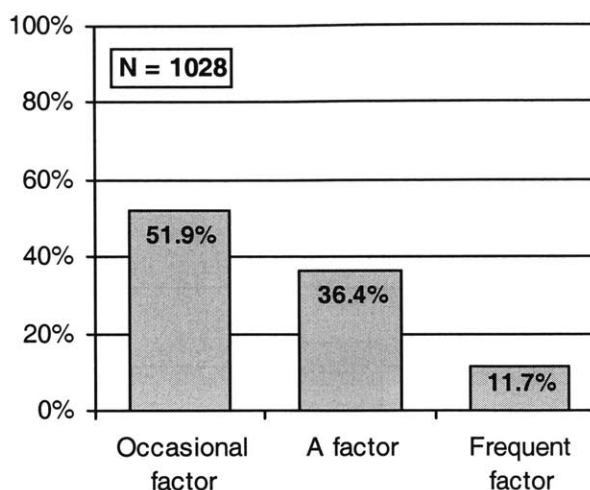


Figure 78: Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Airspace congestion: This issue does not appear to present a significant barrier for most people using GA aircraft for travel. Less than 20% of survey participants rated airspace congestion as any kind of factor (Figure 79), with nearly 68% of those rating it as only an “occasional factor” (Figure 80).

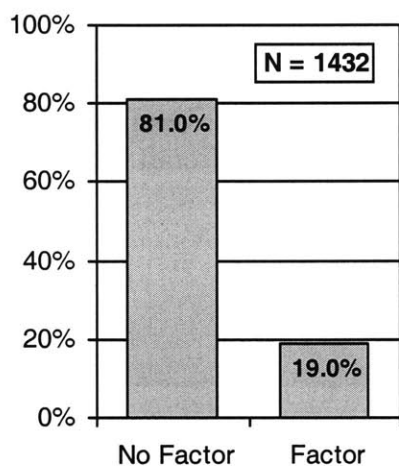


Figure 79: Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

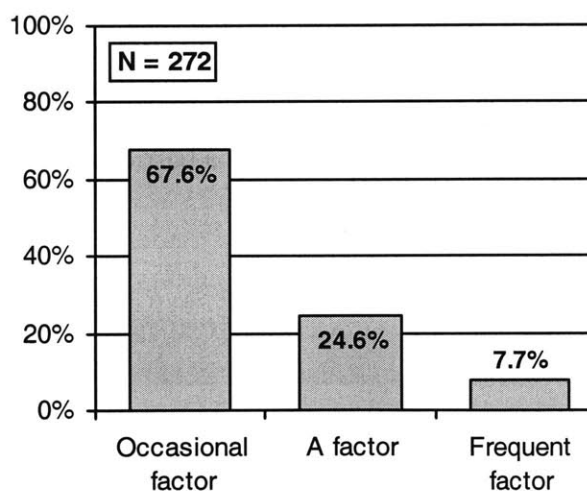


Figure 80: Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Lack of service facilities at destination or en route airports: One-third of those who answered this question rated this issue as some factor in deciding to not travel by GA aircraft (Figure 81). Of those, 68.5% indicated a lack of service facilities as only an “occasional factor” in their decisions (Figure 82).

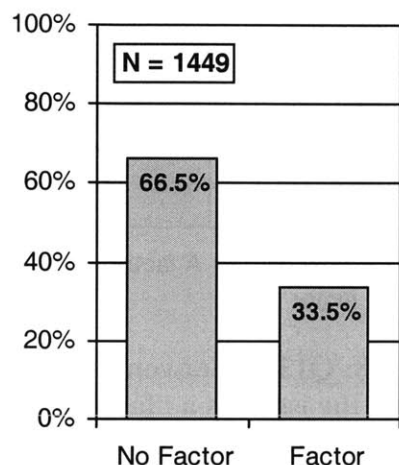


Figure 81: Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

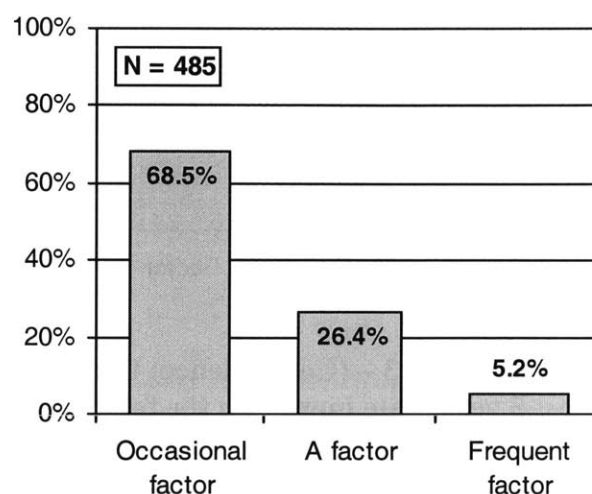


Figure 82: Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Lack of mobility while at destination: This issue ranked as the fourth most highly rated as a factor of some degree in decisions to not travel by GA aircraft (Figure 83). Of those who felt it was some factor, 84% rated it as something less than a “frequent factor” (Figure 84). This is consistent with previous results in questions 6 and 8 where mobility at the destination has rated among the top issues in being a barrier to the utility of general aviation aircraft.

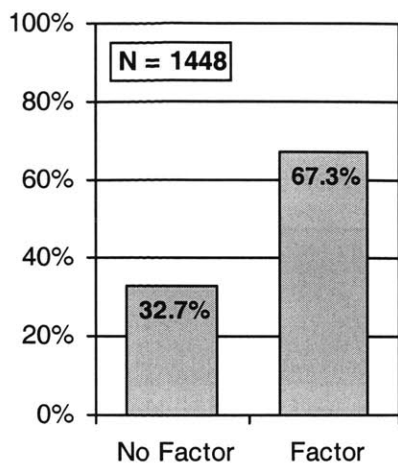


Figure 83: Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

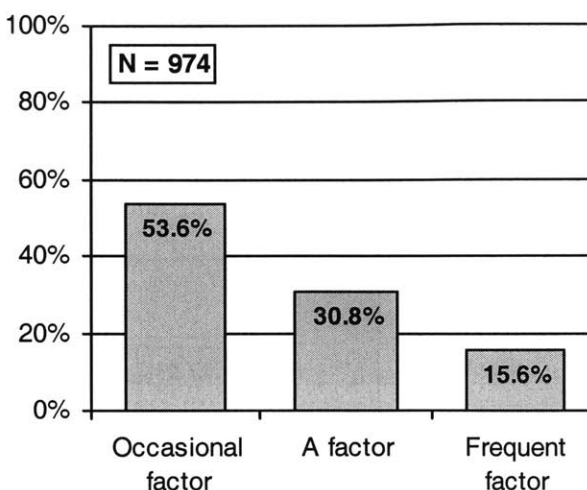


Figure 84: Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Insurance restrictions, Insurance costs: Both of these issues rated largely as “no factor” in deciding to not travel by GA aircraft. Of those few who did rate insurance as an issue, most found it to be an “occasional factor” in their decisions.

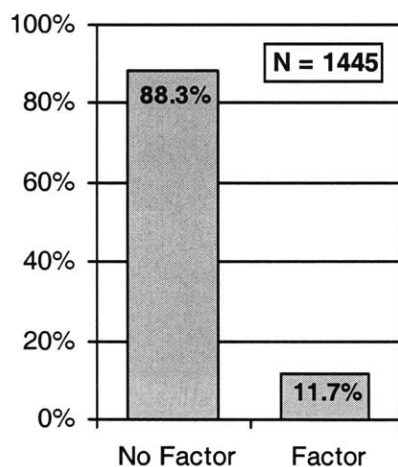


Figure 85: Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

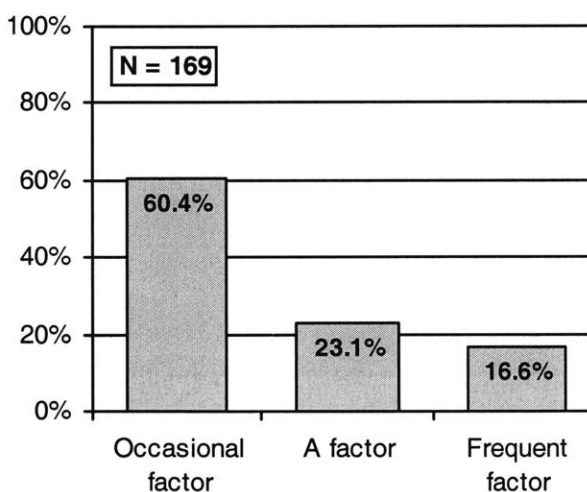


Figure 86: Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

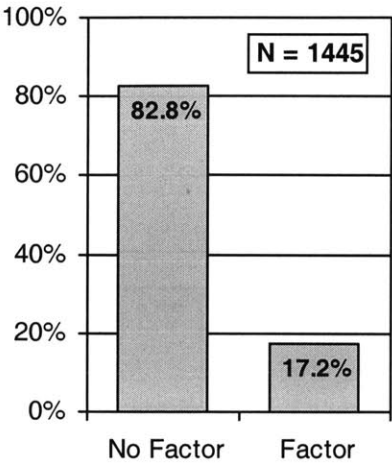


Figure 87: Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

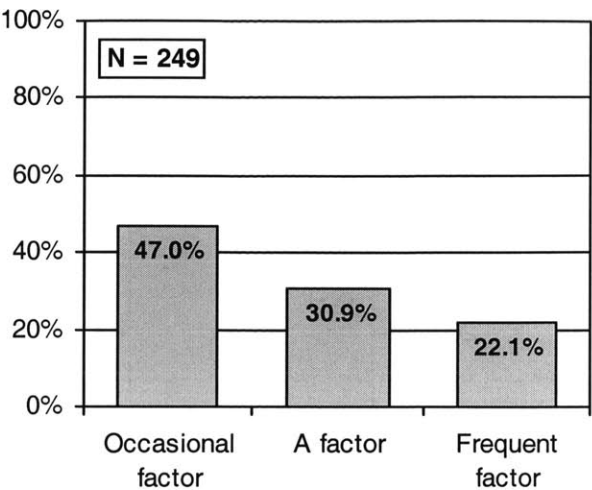


Figure 88: Q13 – (Insurance Costs) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

Question 14: What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?
(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 89, and each is briefly addressed below. “Other” responses included factors such as increased privacy, avoiding contracting illnesses from other passengers, luggage is less likely to get lost, and piloting an aircraft impresses friends and family. The time savings, flexibility, convenience and satisfaction of traveling by GA aircraft rated as the top advantages.

Advantages remained relatively unchanged for aircraft owners and renters and for those who are heavy users of GA or heavy users of the airlines.

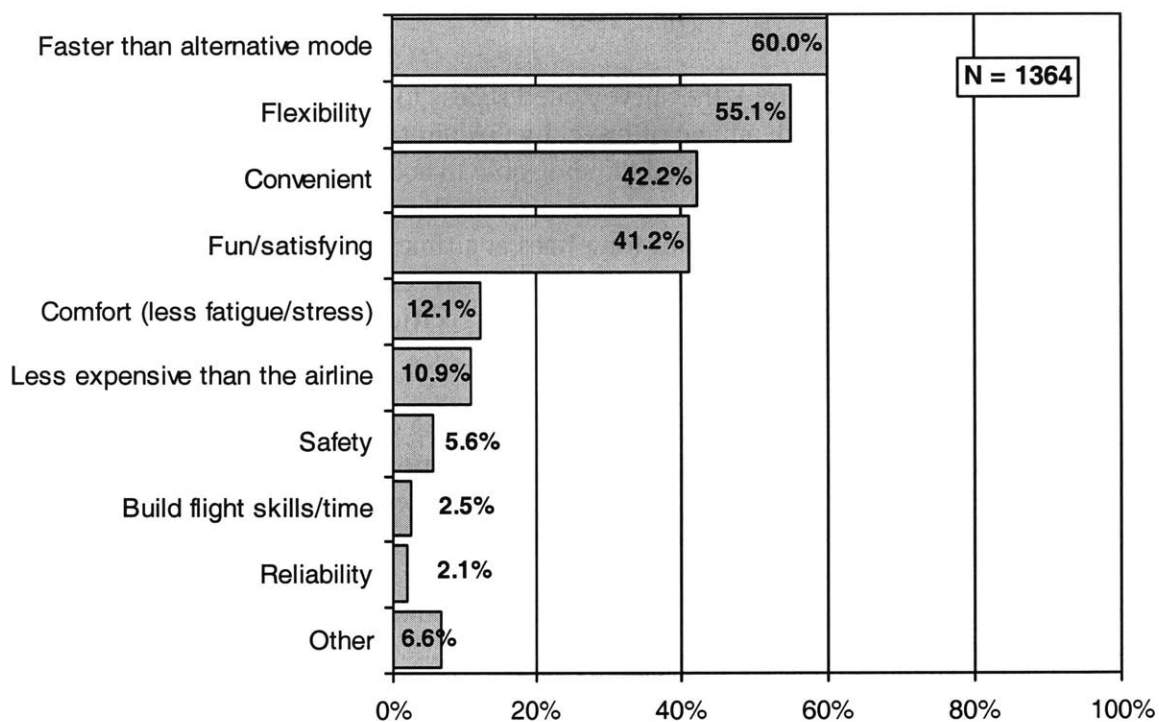


Figure 89: Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

Faster than alternative mode: The advantage of traveling by GA aircraft most frequently identified by survey participants was that it was faster than the alternative modes of travel for a given trip. Nearly every survey response identified the alternative mode and the circumstances under which GA held the advantage. Of the 60% of those who answered in this category, 82.1% identified the car as the slower alternative, while 61.1% identified the scheduled airline. Note that some participants identified both alternative modes, so the percentages do not add to 100%. Typically when the alternative mode was identified as slower it was contingent on trip distance. Typical responses were along the lines of “faster than car if more than X miles” and “can beat airline if under Y miles.” Many of the responses included a consideration of doorstep-to-

destination trip time (including gate check-in and waiting for baggage for commercial airlines) and not simply en route travel time. This is consistent with responses in questions 6 and 8 where the doorstep-to-destination travel time was also considered by many of those who were surveyed.

Flexibility: The ability to alter both travel schedule and destination on short notice was cited as an advantage of traveling by GA aircraft by over 55% of survey participants. Scheduled airlines were cited as the less flexible mode of travel if any mode was identified. The automobile was not cited by anyone who answered this question as a less flexible alternative for travel. While a few respondents indicated that their airline reservations could be made with greater flexibility (e.g. last minute ticket purchase, change departure time on current tickets), they noted that that ability was purchased at a higher cost in the form of change fees and higher ticket prices. A greater choice of which airports to fly into was also cited by a few of those who responded to this question. In question 15 some cited the automobile as being more flexible than GA aircraft because of greater opportunities to stop for food, toilet and other facilities, or to sightsee or rest if the driver is fatigued.

Convenient: Many of those who took the survey cited access to a greater number of GA airports than commercial airports as an advantage of travel by GA aircraft. The greater selection of airports, many responses indicated, resulted in being able to access an airport closer to the actual trip destination than if the scheduled airlines were used. In this same category many also mentioned being able to avoid the hassle of long lines at airline counters and airline delays, waiting in lines for baggage and rental cars at destination. When a specific item of convenience was noted, it was in relation to travel by airline. No one specifically identified GA travel as more convenient than travel by automobile.

Fun/satisfying: The enjoyment and satisfaction of traveling by GA aircraft was cited by 41.2% of those who answered this question. This included an appreciation of the landscape and sunsets while in flight, the challenge of piloting, a sense of being in control while flying, as well as the satisfaction and feeling of accomplishment associated with flying an aircraft.

Comfort: This category included factors such as greater personal space than that afforded by the airlines, as well as less fatigue and stress, which were often associated with both airline and automobile travel. Some cited avoiding the stress of highway congestion, construction zones and reckless drivers as an advantage of GA over the automobile. Avoiding the stress of crowding into an airline with other passengers, "screaming babies," poor food, and recycled (poor quality) air was also cited.

Less expensive than the airline: Traveling by GA aircraft was occasionally cited as less expensive than traveling by airline, again inevitably contingent on distance. At longer distances some of those responding to this question also acknowledged that the airlines are less expensive. Some responses also factored in the number of travelers, where it was mentioned that traveling by GA aircraft is less expensive than the airlines if there is more than one traveler (e.g. the whole family; "four people for the price of one on an airline"). Saving expensive car parking fees at commercial airports was another factor mentioned in several responses. Some of those who answered in this category noted that faster and more flexible GA transportation made one-day trips feasible, whereas rigid airline schedules often necessitated an overnight stay with the

associated additional expense of hotel and meal bills. In only five cases was the value of the travelers' time taken into consideration, where GA was faster and therefore saved time/money. It was not found that anyone who answered this question cited GA as a less expensive form of travel over the automobile.

Safety: Travel by GA was most often cited as a safer mode of transportation than the automobile. A very few did indicate that since they were PIC and/or maintained their own GA aircraft, they felt safer than when traveling by airline.

Build flight skills/time: This category might have arguably been included in the fun/satisfying category as well. Some felt the ability to hone flying skills and build flight time was an advantage to traveling by GA aircraft.

Reliability: Just over 2% of those who answered this question felt GA travel was more reliable in comparison to airline or automobile travel. Most often noted were unanticipated delays when traveling on the airlines.

Question 15: *What advantages does traveling by automobile have over travel by GA aircraft?*
(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 90, and each is briefly addressed below. “Other” responses included factors such as easier customs clearances, not having to maintain piloting proficiency, access to a company car, a greater confidence in driving skills when ill or fatigued, as well as the ability of most passengers to share driving responsibilities. Mobility at the destination, elimination of weather as a travel factor, expense, and ease of access were most frequently cited as advantages. It is interesting to note that 4% of those who answered this question responded that the automobile held no advantages over travel by GA aircraft.

Advantages remained relatively unchanged for those who are heavy users of GA or heavy users of the airlines.

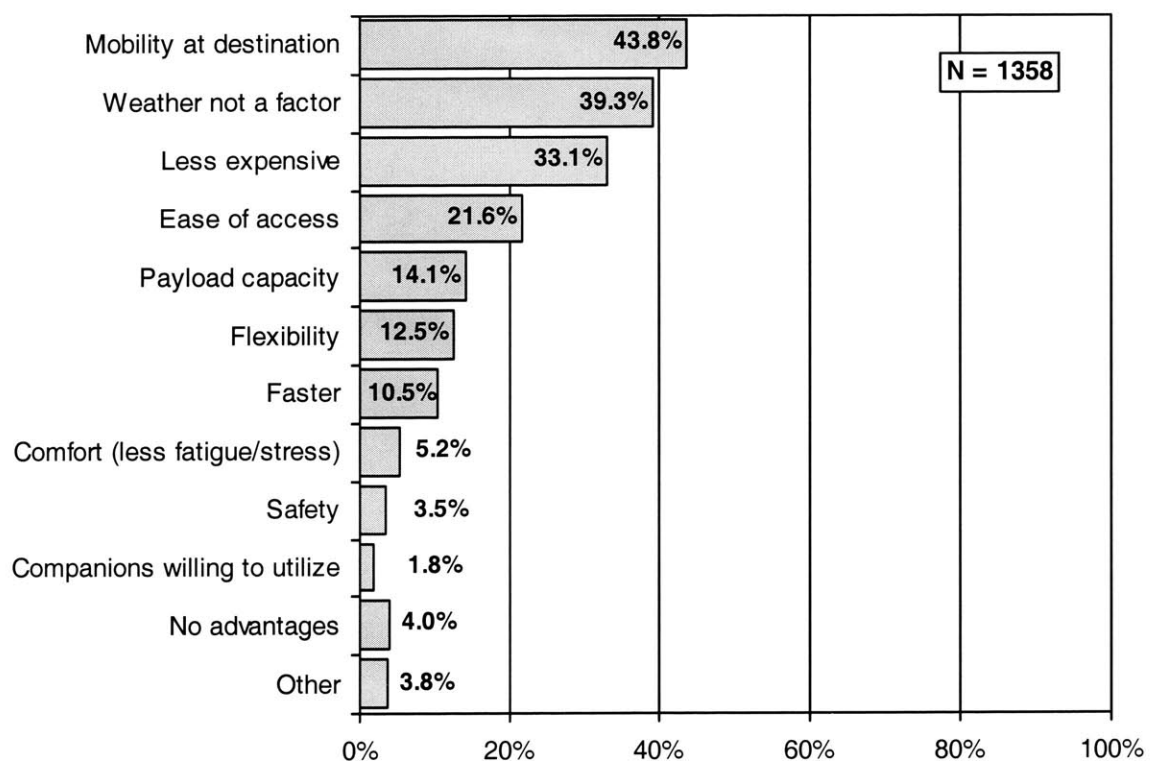


Figure 90: Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

Mobility at destination: The fact that travelers would have ready access to a car at their destination was the most frequently cited advantage of traveling by automobile over GA aircraft. This is consistent with responses to question 8 where mobility at the destination was cited as a major factor for choosing to not travel by GA aircraft.

Weather not a factor: Of those responding to this question, 39.3% indicated that weather was largely eliminated as a factor in traveling by automobile. Many survey participants noted that

only the most extreme weather conditions (e.g. blizzard, ice storm) barred travel by automobile. This would seem to be a significant advantage of the automobile, as it has been seen from questions 6 and 8 that weather is the most frequently cited factor in making travel mode choices, and also in choosing to not travel by GA aircraft.

Less expensive: As noted in the discussions of previous questions, the expense of the travel mode is often cited as being dependent on the trip distance. Overall, that was not the case for the responses in this category for automobile travel. While a few responses were along the lines of “for shorter trips the car is cheaper” most responses were a blanket statement “travel by car is cheaper” without a trip distance qualification. In some cases the advantage of avoiding the additional cost of renting a car at the destination was also cited. Owners of aircraft did not rate less expensive auto travel as an advantage quite as often as the overall survey population, dropping in responses to 22.3% (Figure 91). However, aircraft renters elevated this factor to the number one most mentioned advantage of auto travel, with a 48.4% response rate (Figure 92). Previous questions in the survey have also suggested that renters are somewhat more sensitive to the cost of the travel mode.

Ease of access: The ability to easily access an automobile was cited by 21.6% of those who responded to this question. This included access at the trip origin (not having to drive to an airport, preflight an aircraft, or be concerned with significant route planning prior to departure) as well as access at the destination (not having to rent a car). True “door-to-door service” was quoted by several of those who took the survey as being an advantage the automobile held over travel by GA aircraft.

Payload capacity: The ability to carry a greater number of passengers or more cargo was cited as an advantage of travel by automobile over GA aircraft. This included not having, for practical purposes, weight restrictions on payload and being able to accommodate a greater volume of cargo. Some also indicated that sensitive equipment associated with their business trips could be damaged by turbulence or hard landings in GA aircraft, so they opted for traveling with it by car. In question 8, payload capacity was also cited by some as a major reason for choosing to not travel by GA aircraft.

Flexibility: The ability to change both schedule and destination at short notice was cited by some as an advantage the automobile holds over travel by GA aircraft. This included a greater ability and opportunity to stop for food, toilet or other facilities, to stop due to driver fatigue, or to look at scenery and local attractions.

Faster: As with earlier questions, this response was contingent on trip distance. For shorter trips survey participants indicated that an automobile would be faster than traveling by GA aircraft. This often considered total doorstep-to-destination travel time, where easy access to a slower automobile overcame the time spent on preflight and post flight chores for GA travel.

Comfort: More personal space and the availability of greater “creature comforts” such as air conditioning and a car stereo were advantages over travel by GA cited by some. Other specifics include less noise in the passenger area and more comfortable seats in an automobile.

Safety: A few mentioned safety of travel by automobile as an advantage over travel by GA aircraft. Some of these mentioned that the safety was perceived by their passengers, or that safety was greater under a wider variety of weather conditions or pilot physical and mental conditions, night time travel, or in case of mechanical failure.

Companions willing to utilize: In question 8 it had been noted by some that a major factor in choosing to not travel by GA aircraft was that traveling companions were unwilling to use GA as a mode of transportation. In response to this current question, some of those surveyed indicated that an advantage of the automobile was that it is widely accepted by travelers.

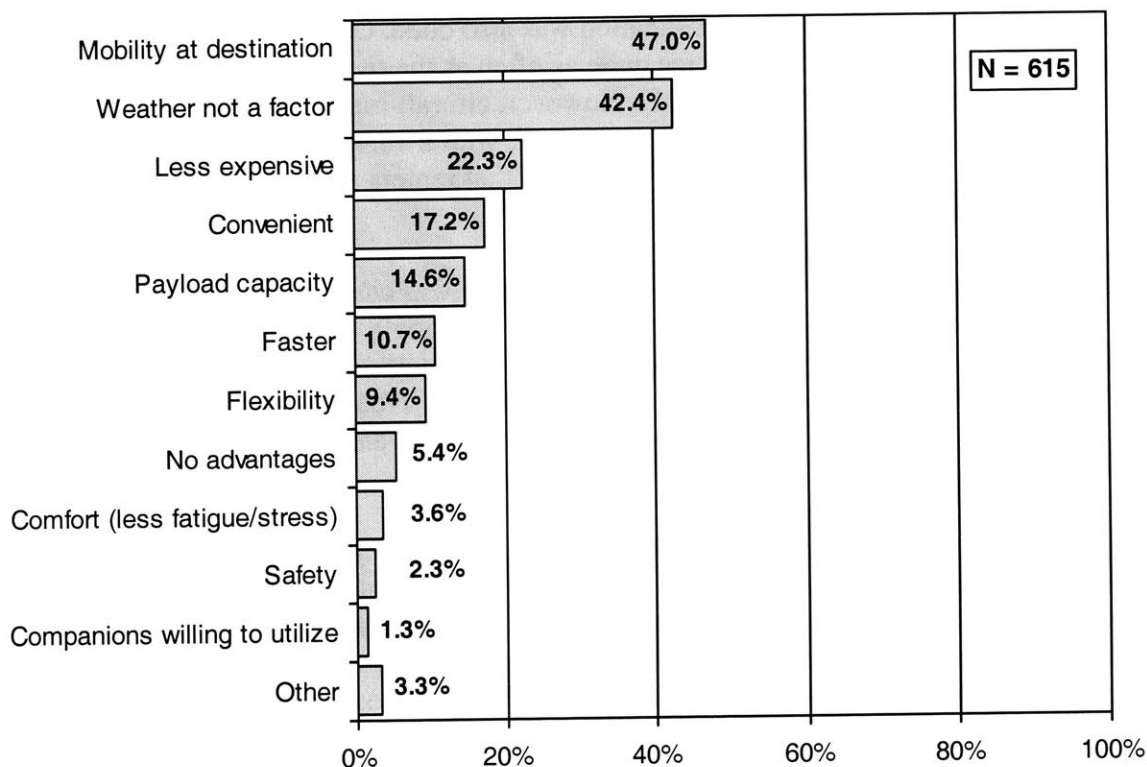


Figure 91: Q15 – (Owners) What advantages does traveling by automobile have over travel by GA aircraft?

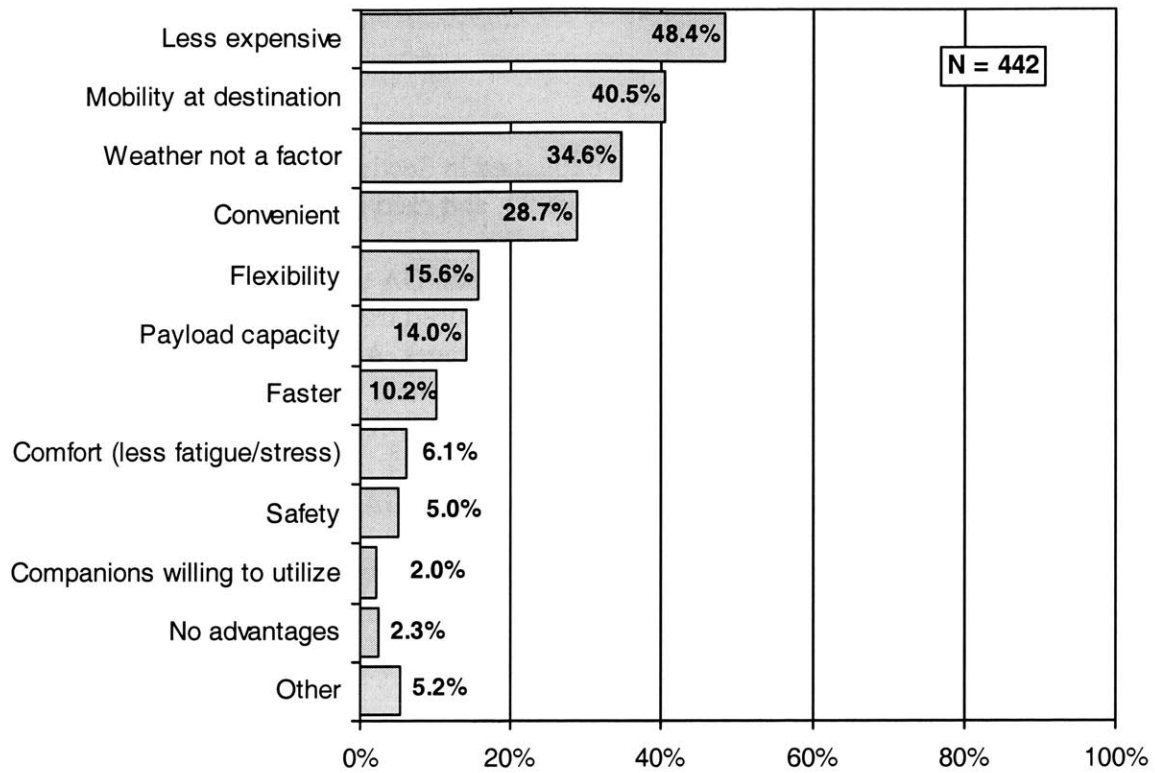


Figure 92: Q15 – (Renters) What advantages does traveling by automobile have over travel by GA aircraft?

Question 16: *What advantages does traveling by scheduled airline have over travel by GA aircraft?*

(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 93, and each is briefly addressed below. “Other” responses included factors such as traveling companions are willing to fly on airlines, employers and clients accept airline travel more readily than GA travel, frequent flyer miles, and customs clearance is easier when traveling by airline. Reduced travel time, weather being less of a factor, and expense were most frequently cited as advantages. Almost 4% of those who answered this question responded that the scheduled airlines held no advantage over travel by GA aircraft.

Advantages were unchanged for those who are heavy users of GA or heavy users of the airlines.

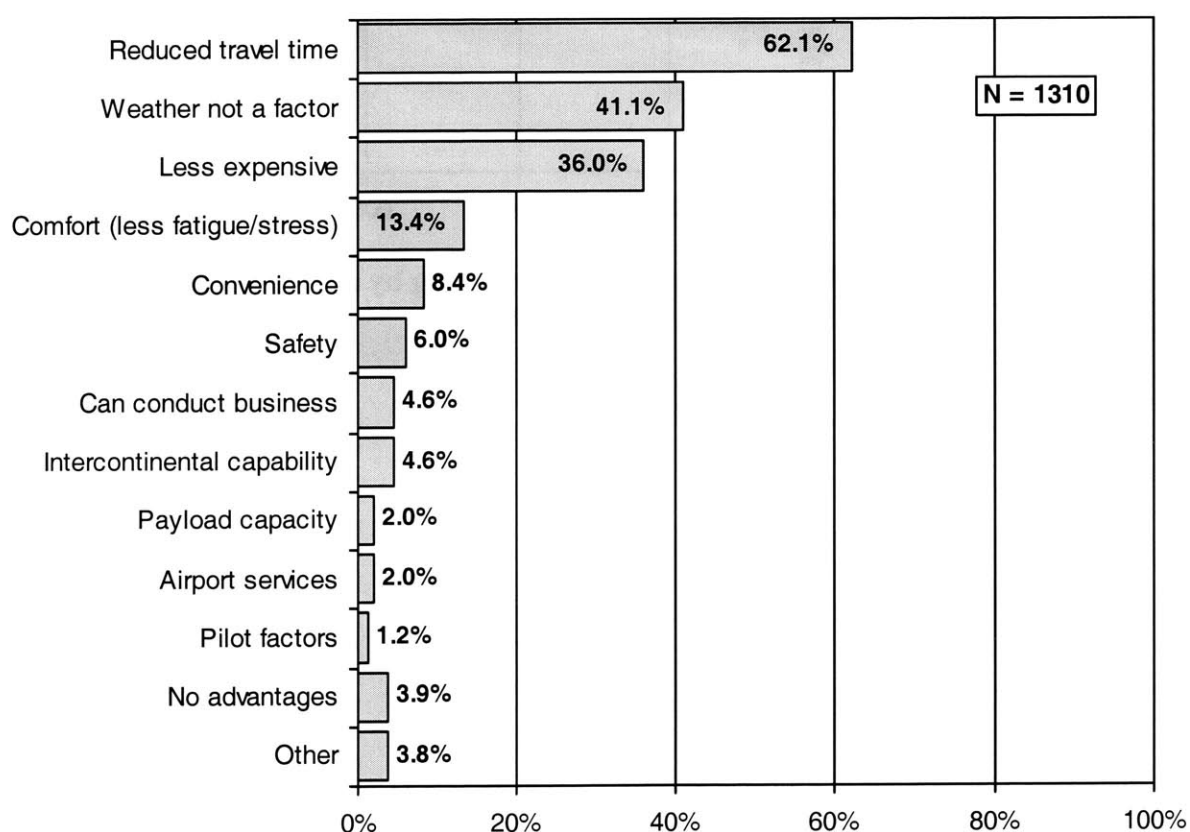


Figure 93: Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

Reduced travel time: Travel by scheduled airline was cited as being faster than travel by GA aircraft, inevitably with the caveat that longer distances were being considered. As with other questions, many of the survey respondents did appear to be considering total doorstep-to-destination time.

Weather not a factor: Of those responding to this question, 41.1% indicated that weather was largely eliminated as a factor in traveling by scheduled airline, with the exception of severe weather such as icing. As noted under question 15, this would seem to be a significant advantage over GA travel, as we've seen from questions 6 and 8 that weather is the most frequently cited factor in making travel mode choices, and also in choosing to not travel by GA aircraft.

Less expensive: Airline travel was cited as less expensive than GA travel, but only under certain conditions. At longer distances the airlines were noted as holding the advantage, as well as if the traveler could plan ahead and purchase less expensive tickets in advance. Those surveyed also noted that in some markets airfares were low enough to make GA travel more expensive even for short trips. "Supersaver" airfares were noted as typically being unbeatable by GA. Some noted that the expense of the travel mode also depended on the number of travelers, with multiple passengers often being less expensive traveling via GA rather than purchasing multiple airline tickets. Aircraft renters, as in question 15, seemed more sensitive to travel costs by indicating this advantage more often (47.6%) (Figure 94) and owners cited it less often (28.2%) (Figure 95).

Comfort: This category included factors such as the ability to sleep and relax while in flight, as well as walk around the cabin, toilet access, and get meal/drink service. As noted earlier in the survey, most survey participants were considering single engine aircraft when thinking of general aviation, so the comparison in this question is not being made to cabin class GA aircraft. Also noted in some responses to this question was less cabin noise on an airline and a smoother ride.

Convenience: In this case, convenience did not typically include ease of access to the travel mode. Instead, this category included factors such as not having to perform preflight planning and checks on the weather, and not having to act as pilot and navigator for the flight. A few of those surveyed did note that access to major metropolitan areas was easier via the airlines than by using GA aircraft.

Safety: Some indicated that travel by commercial airline was safer than by GA aircraft, with a few citing accident statistics as evidence. In some instances safety was related to the ability to fly safely through adverse weather or more safely over long distances (e.g. transcontinental).

Ability to do work/conduct business: This category included factors such as the ability to work en route on a laptop, read paperwork, talk on an air phone and hold business conversations in a passenger cabin somewhat less noisy than a GA aircraft cabin.

Intercontinental capability: Those who responded in this category indicated that their GA aircraft was not a practical means of transportation for traveling overseas (sometimes specifically mentioned as Europe or Asia).

Payload capacity: For this question some indicated that the airlines hold an advantage over GA travel in the maximum number of passengers and amount of baggage that can be carried, although excess baggage may cost more. Also noted were weight restrictions on payload when traveling by GA aircraft.

Airport services: This category included factors such as access to ground transportation, food, and nearby hotels.

Pilot factors: Included here were factors such as being able to travel even when the traveler is ill and/or medicated as well as fatigued, stressed or not current in pilot flight hours.

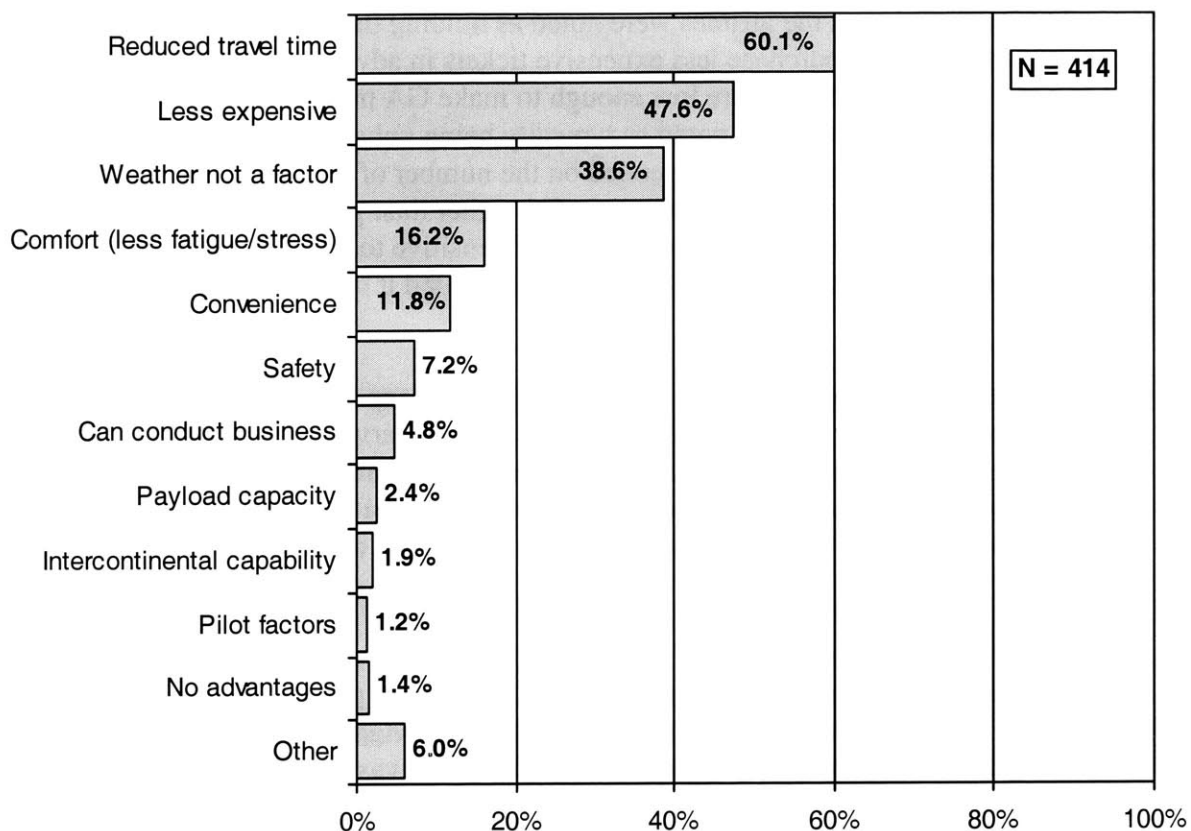


Figure 94: Q16 – (Renters) What advantages does traveling by scheduled airline have over travel by GA aircraft?

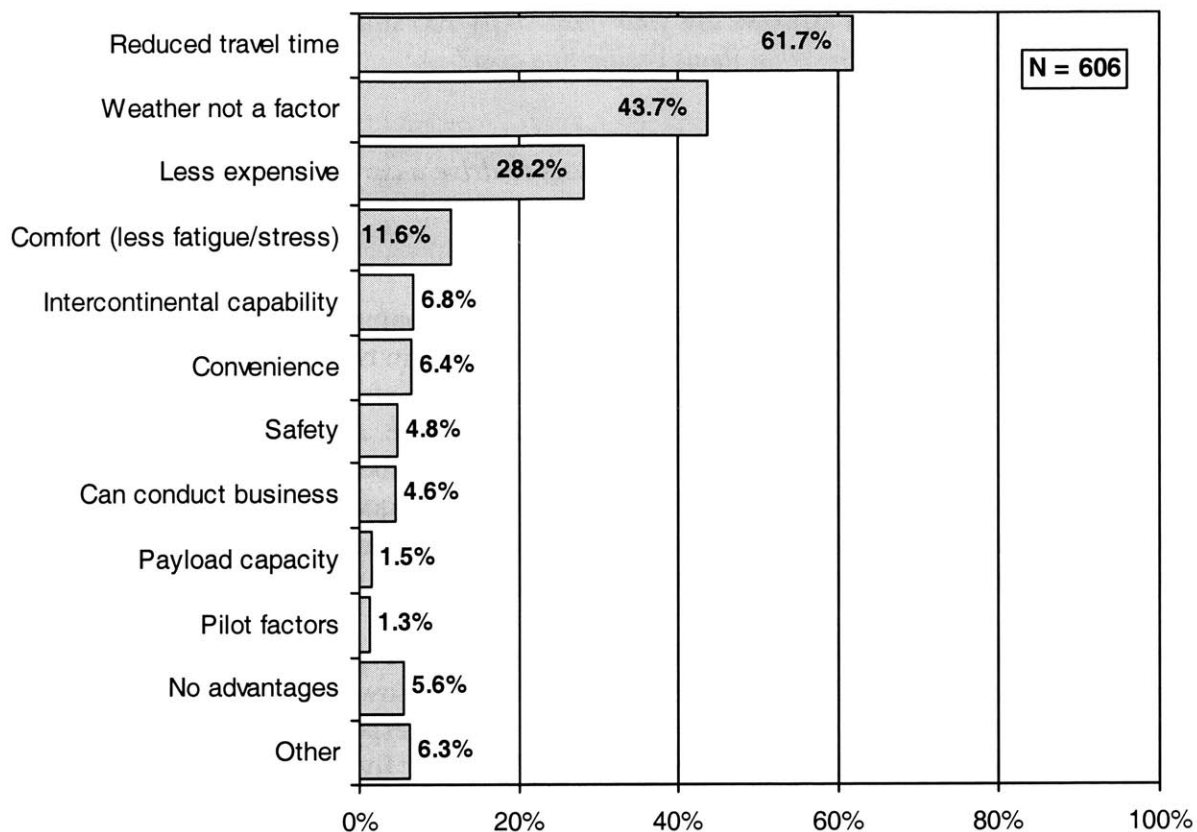


Figure 95: Q16 – (Owners) What advantages does traveling by scheduled airline have over travel by GA aircraft?

Question 17: What would you estimate are your costs to fly 100 statute miles (consider the aircraft you identified earlier)? What items create this cost?
(free form response)

Question 18: What would you estimate are your costs to drive a car 100 statute miles? What items create this cost?
(free form response)

Questions 17 and 18 were constructed to be similar for direct comparison of costs and cost factors for GA and automobile travel. Each question was asked in two parts to 1) gather estimated costs of traveling by the mode in question, and 2) get information on what cost factors people consider when traveling by GA aircraft and by automobile. As mentioned in Section 2.1, the distance in these questions was quoted as an even, round number to give people a baseline for their estimate. Quoting a flight time (e.g. “cost to fly 1 hour”) in question 17 would have left uncertainty as to travel distance since aircraft speeds may vary significantly. The distance was also quoted in statute miles for both questions to facilitate direct comparison of the responses.

The estimated costs from both questions 17 and 18 are shown in Figure 96. The mathematical mean for the estimated costs to fly 100 statute miles is \$90.20. However, the median is \$70.00, so the mean does not reflect typical costs quoted by those who responded to this question (evident by the long upper tail in Figure 96). Estimated costs for flying were sorted in two ways to attempt to identify any interrelationships: by aircraft type and by those who do not rent their aircraft.

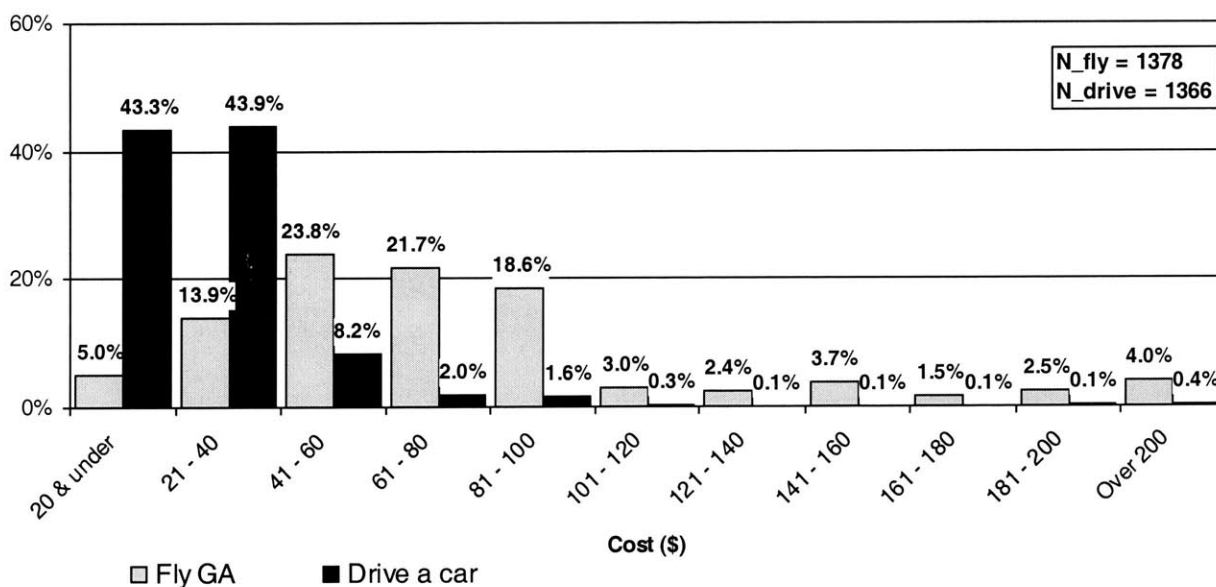


Figure 96: Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

Costs to fly 100 statute miles for those who identified single engine aircraft as their GA aircraft under consideration were isolated and are shown in Figure 97. It was thought that perhaps those considering twin engine aircraft were biasing the mean cost in Figure 96. For the single engine costs, the mean is somewhat lower at \$75.47 and the median is \$65.00. This indicates that some of the higher cost estimates were indeed due to the aircraft type under consideration.

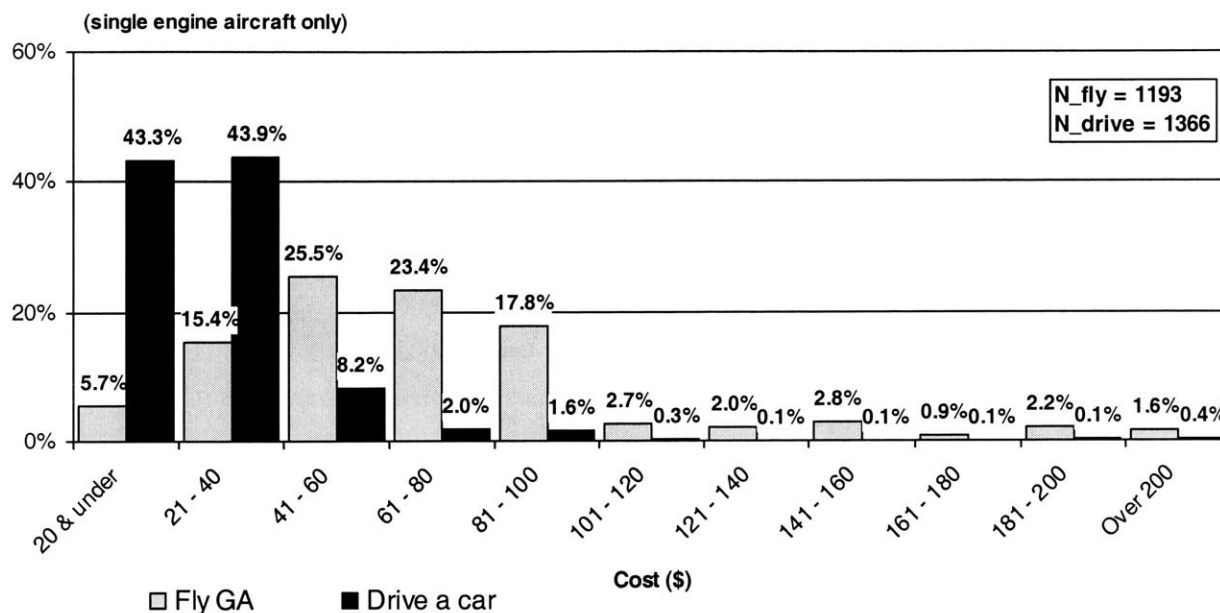


Figure 97: Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

In addition, it was considered that those who rent their aircraft on a regular basis may be biasing the estimated costs in Figure 96. The costs from those who indicated on question 3 that they rented their aircraft or owned a share in a fractional program were separated from the overall survey population and are shown in Figure 98. Some additional estimates were taken out if they indicated in question 17 that their costs were based on aircraft rental rates. Also shown in Figure 98 is a new sorting of estimated driving costs from question 18. Those who indicated in this question that they were considering car lease or per diem rates were separated from the overall survey population.

The mathematical mean of estimated costs to drive 100 statute miles is \$29.92 for the overall survey population (shown in Figure 96). The median is \$25, indicating little skewness to the data. With the new data sort shown in Figure 98 the mean for driving remains largely unchanged, dropping \$2 to \$27.93.

For the data in Figure 98 the mean of estimated costs to fly 100 statute miles is \$87.00, which is only down \$3 from the overall survey results. The median is still significantly lower at \$60.00. It does not appear that those who rent their aircraft or those who lease cars or quote per diem rates are consistently quoting higher costs than those who do not rent or lease.

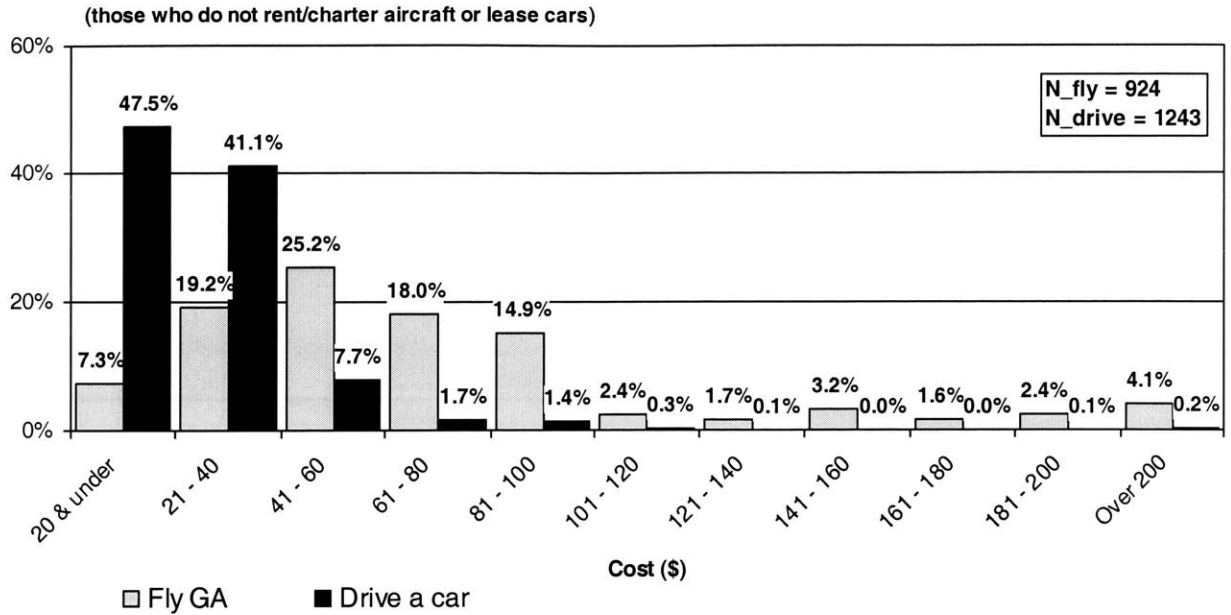


Figure 98: Q17 and Q18 – Estimated Costs For Those Who Do Not Rent/Charter GA Aircraft Or Lease Cars

If the true typical estimated cost to fly 100 statute miles in a single engine aircraft is taken to be approximately \$65 (the median from the data in Figure 97) and the costs to drive \$25 (the median for the overall survey population), one may conclude that there is a perceived difference of $\$65 - \$25 = \$40$ between driving a car and flying a single engine GA aircraft 100 statute miles.

Question 17: What items create this cost?
(free form response)

In both questions 17 and 18, those who were surveyed were asked to list sources of the costs that they had considered in their cost estimates. The items that were reported as creating the costs discussed above will be presented here for question 17. Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 99, and each is briefly addressed below. “Other” responses included factors such as ground transportation, food, and the value of the travelers’ time. Fuel charges, maintenance, insurance, rental costs and hangar or tie down fees were most frequently cited as cost items.

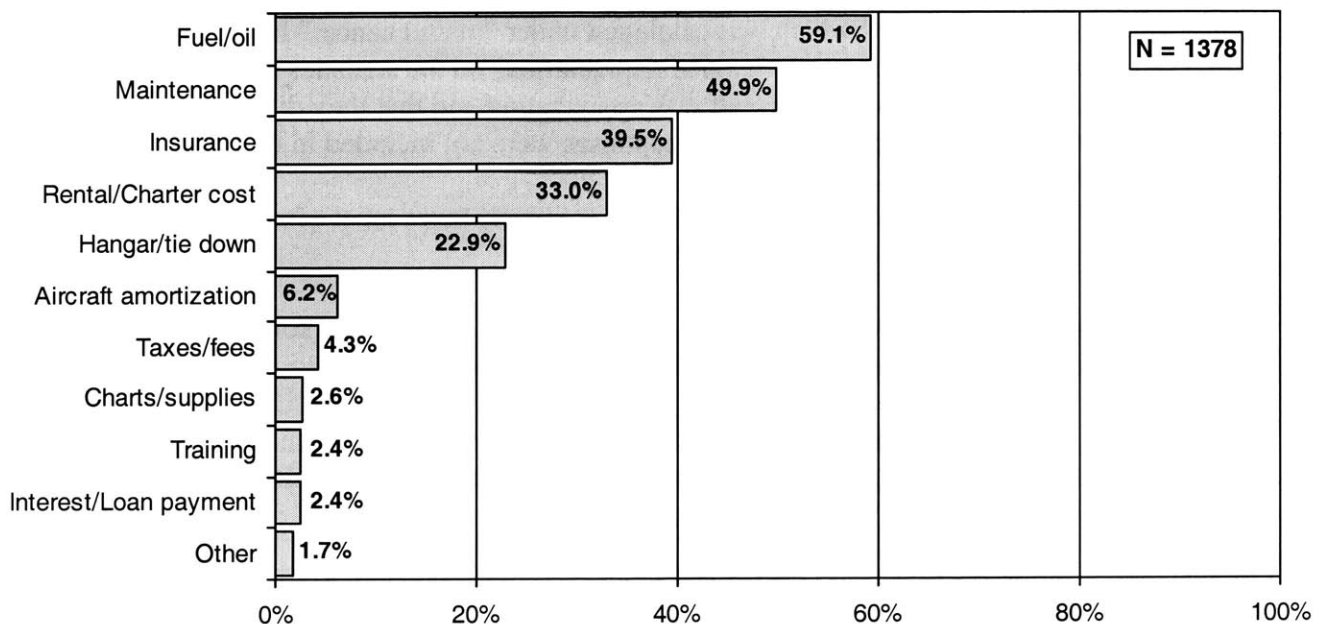


Figure 99: Q17 - What items create this cost to fly 100 statute miles?

Fuel/oil: This category included any charges associated with fueling the aircraft or adding oil. Most of those surveyed simply indicated “fuel and oil” in their response for this category.

Maintenance: Many responses simply included “maintenance” or “Mx” as one of the cost factors. Also included in this category were responses such as “engine reserve” and “propeller reserve.” Annual inspection costs were also included here.

Insurance: This category included any form of insurance that was indicated in the survey responses to this question. Most simply indicated “insurance” or “liability insurance” in their response.

Rental/Charter cost: One-third of those who responded to this question indicated that their costs were based on rental fees or charter costs. Some indicated “wet rental” rates specifically. In almost every case these were the same people who indicated in question 3 that they typically obtained their aircraft by renting it. There were a few additional survey participants in this category who had indicated “other” or that they obtained their aircraft through a flight department in question 3.

Hangar/tie-down: This category included parking and tie-down fees as well as hangar rental or hangar amortization costs if the individual owned the building.

Aircraft amortization: Over 6% of those who responded to this question indicated that they also considered some charge for the money invested in their aircraft. Factors included in this category were aircraft and/or engine depreciation and responses such as “cost of airplane,” “aircraft amortization” and “cost of capital.” One could argue that engine depreciation may also be equivalent to “engine reserve” which was cataloged under “maintenance.” However, exactly three responses in this category were “engine depreciation” so the statistics are not appreciably affected. Some indicated that their aircraft was appreciating and that they did not consider charges associated with its purchase. These responses were not included in this category.

Taxes/fees: Factors in this category included taxes (property taxes most often cited) as well as landing, license, registration and customs fees.

Charts/supplies: Some of those who responded to this question indicated some charges associated with buying charts, databases, publications or other miscellaneous supplies.

Training: Some indicated that they also considered their training costs in answering this question. While most simply responded “training,” some indicated “recurrency training” or “proficiency training” specifically.

Interest/Loan payment: Included in this category were those who considered their loan payments or interest on the aircraft purchase loan as part of their estimated costs.

Those who indicated that they rent or charter their aircraft (from question 3 as well as from the current question) were also removed from the data to see how the remaining percentages were affected. The new distribution is shown in Figure 100. This indicates that, of those who do not rent or charter aircraft, there is a high item awareness of fuel/oil, maintenance and insurance costs. To a lesser extent hangar/tie-down costs are also considered.

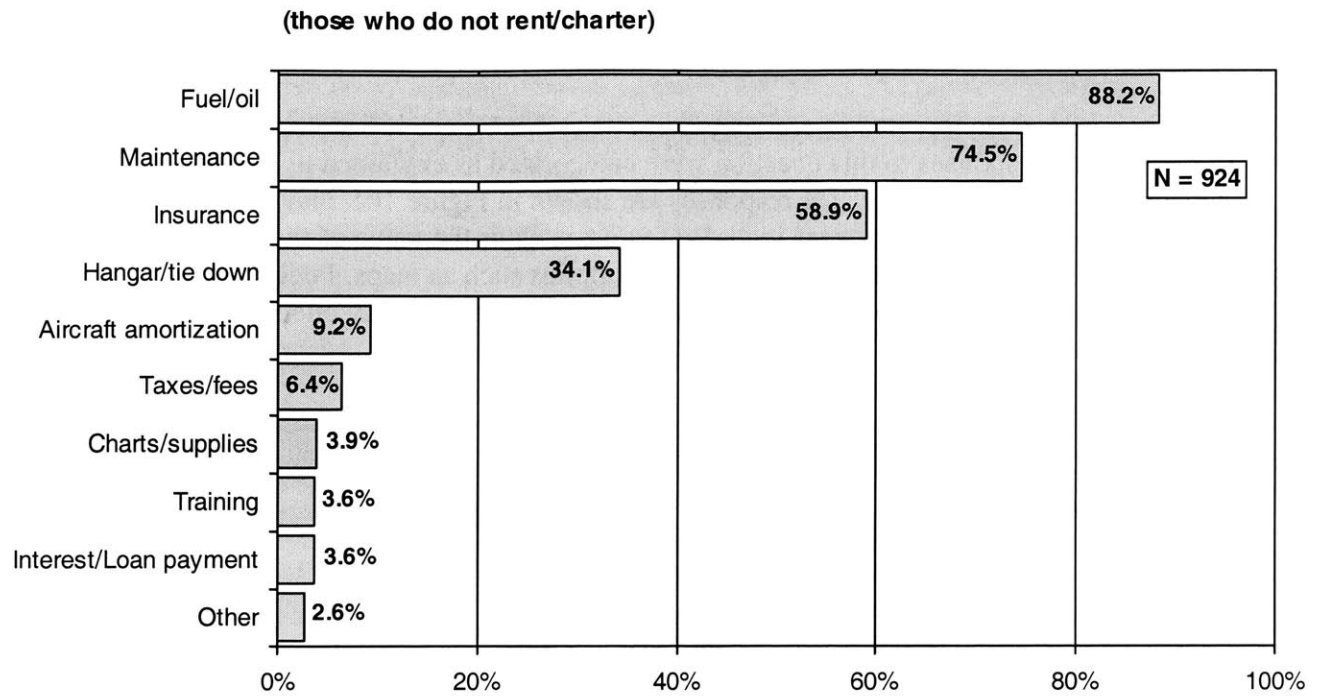


Figure 100: Q17 – (Non-renters) What items create this cost to fly 100 statute miles?

Question 18: What items create this cost?
(free form response)

The items which were reported as creating the costs to drive a car 100 statute miles will be presented here. Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 101, and each is briefly addressed below. “Other” responses included factors such as the value of the travelers’ time, dues to auto clubs such as AAA, and the cost of supplies such as maps. Fuel charges, maintenance, insurance, and vehicle depreciation were most frequently cited as cost items.

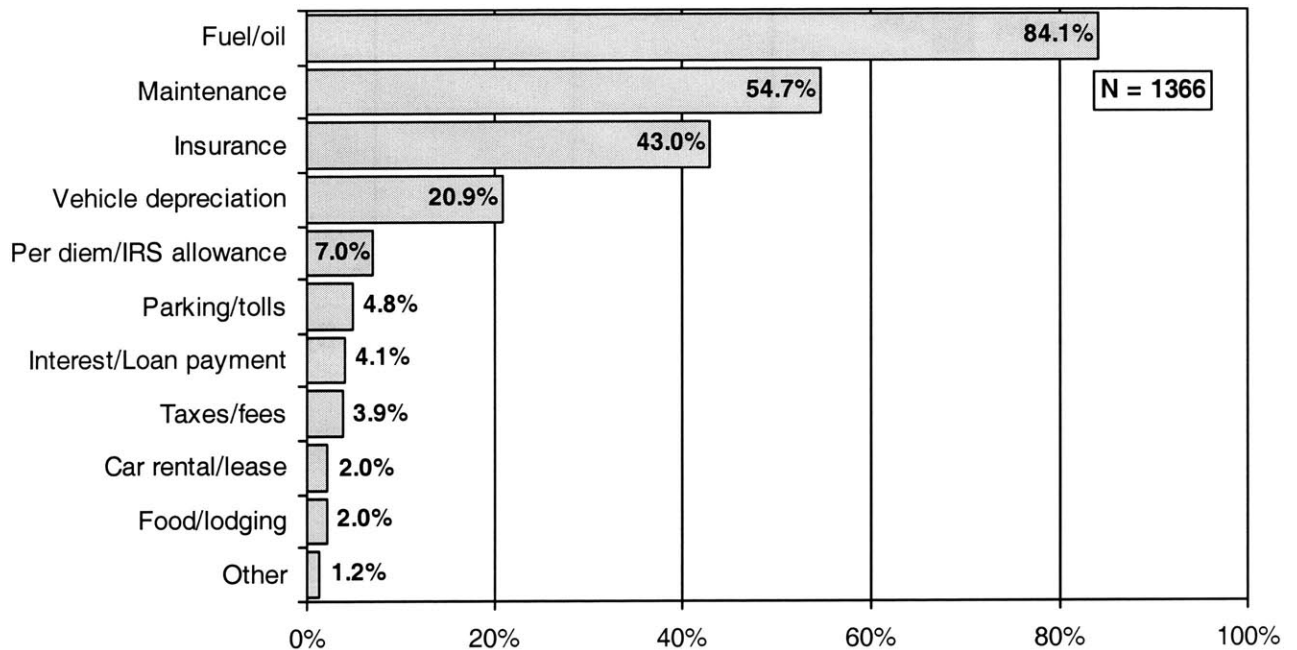


Figure 101: Q18 - What items create this cost to drive a car 100 statute miles?

Fuel/oil: As in question 17, this category included any charges associated with fueling the car or adding oil. Most respondents simply indicated “fuel and oil” in their response for this category.

Maintenance: Most responses simply indicated “maintenance” as one of the cost factors. If tire replacement costs were specifically noted they were included in this category as well.

Insurance: As in question 17 this category included any form of insurance that was indicated in the survey response to this question. Most simply indicated “insurance” or “liability insurance” in their response.

Vehicle depreciation: Many of those who responded to this question included depreciation of their vehicle as part of their cost estimate. In almost all cases the response was simply “depreciation.”

Per diem/IRS allowance: Some indicated that their cost estimate to drive 100 statute miles was based on a per diem allowance, or specifically on the IRS allowance for business trips. There was variation in the quoted IRS and per diem allowances, but typically they ranged from 30 to 50 cents per mile. As indicated in the previous discussion of cost estimates, these quoted rates did not significantly alter the overall mean cost estimated by those who took the survey.

Parking/tolls: Fees associated with parking a car as well as highway tolls were included in this category.

Interest/Loan payment: As with question 17, some of those surveyed indicated that they also considered their car purchase loan payments and/or interest on their loan in their estimated costs.

Taxes/fees: Factors in this category included taxes (property taxes were again most commonly cited) as well as license, registration and inspection fees.

Car rental/lease: A few of those who responded to this question indicated that their estimated costs for driving 100 statute miles were based directly on their car rental or lease costs.

Food/lodging: Some also included costs associated with lodging and meals while on trips as part of their costs to drive 100 statute miles.

Those who indicated that they lease or rent a car, as well as those who quoted per diem or IRS rates, were removed from the data to see how the remaining percentages were affected. The new distributions are shown in Figure 102. The data indicates that, of those who do not rent/lease or did not quote a per diem rate, there is a high item awareness of fuel/oil, maintenance and insurance costs. To a lesser extent vehicle depreciation costs are also considered. These results are quite similar to the item awareness for flying from question 17.

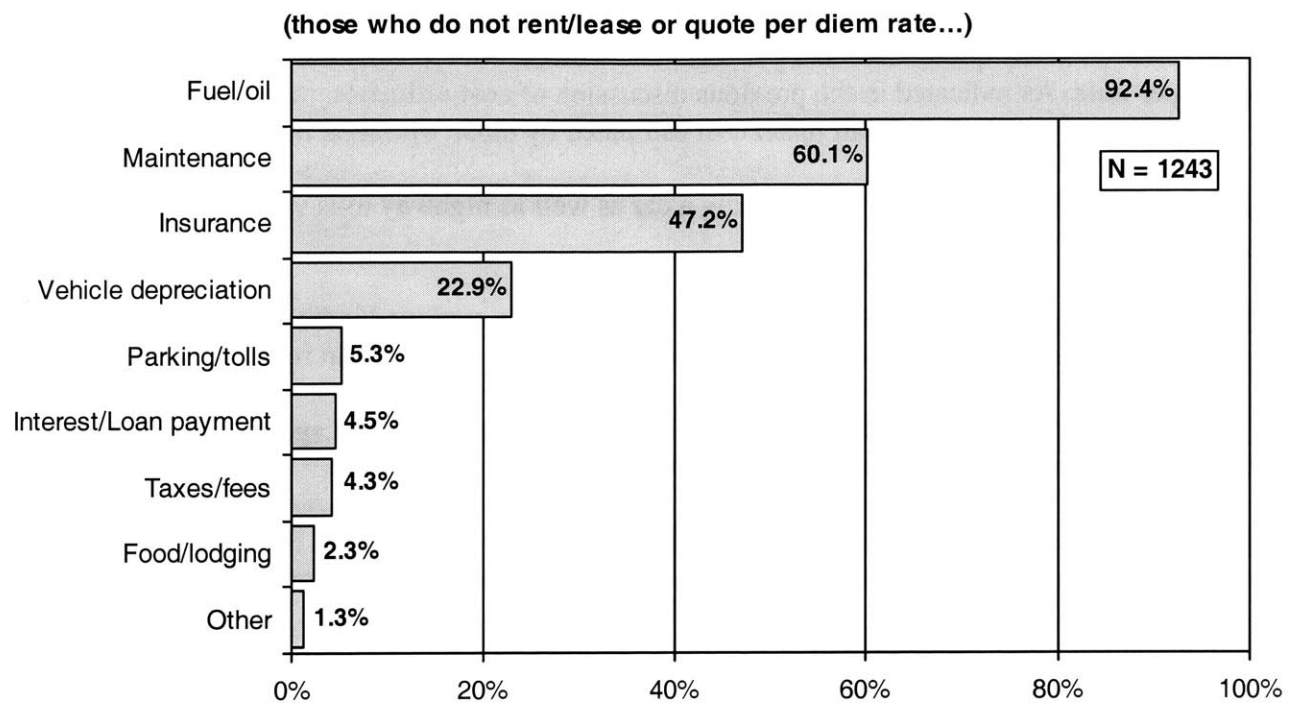


Figure 102: Q18 – (Non-rent/lease/per diem) What items create this cost to drive a car 100 statute miles?

2.4.4 Section IV: Improving General Aviation Utility

In this section, those who completed the survey were asked an open-ended question pertaining to their opinions on how to improve the utility of GA transportation. This question largely served to check for consistency with prior questions on utility barriers, as well as to allow the individual to address additional issues not raised earlier. Finally, the last question in the survey posed a hypothetical dispatch service to the individual and sought their opinion on the usefulness of the service.

Question 19: What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

(free form response)

Responses to this question were categorized as explained in Section 2.2.3. The top categories with greater than 1% responses are shown in Figure 103, and each is briefly addressed below. “Other” responses varied widely and included factors such as reducing customs requirements when flying by GA internationally, supplementing flight instructors’ income to improve the quality of flight instruction available, making charts and other flight information more widely available on the Internet, and improving infrastructure for seaplanes.

The most frequently cited factor for reducing barriers to general aviation travel was to reduce costs in some manner. Additional issues included reducing complexity and updating GA technology, building more runways and GA airports, as well as modifying flight procedures in some manner. Each of these issues is discussed in greater depth in this section.

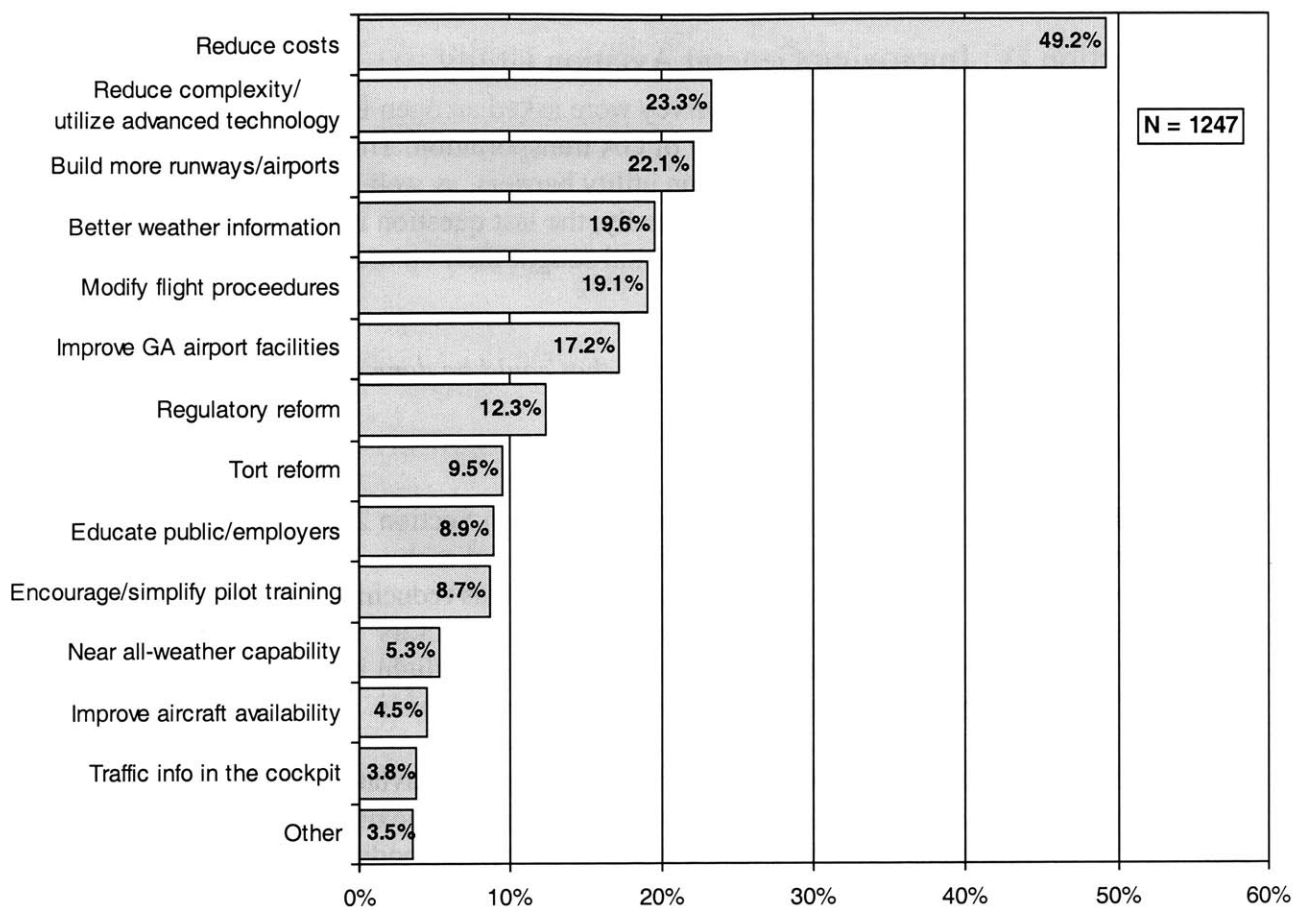


Figure 103: Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

Reduce costs: This was the most frequently cited factor by those who responded to this question, receiving more than twice the number of comments as the next highest factor regarding updating technology. For those who mentioned a reduction in costs as being important, the nature of which costs were acting as barriers to GA utility varied, with no clear majority in any category. The various sources for cost reductions that were mentioned are shown in Figure 104.

...of those who said "reduce costs," specific areas cited for cost reduction:
(multiple responses per person)

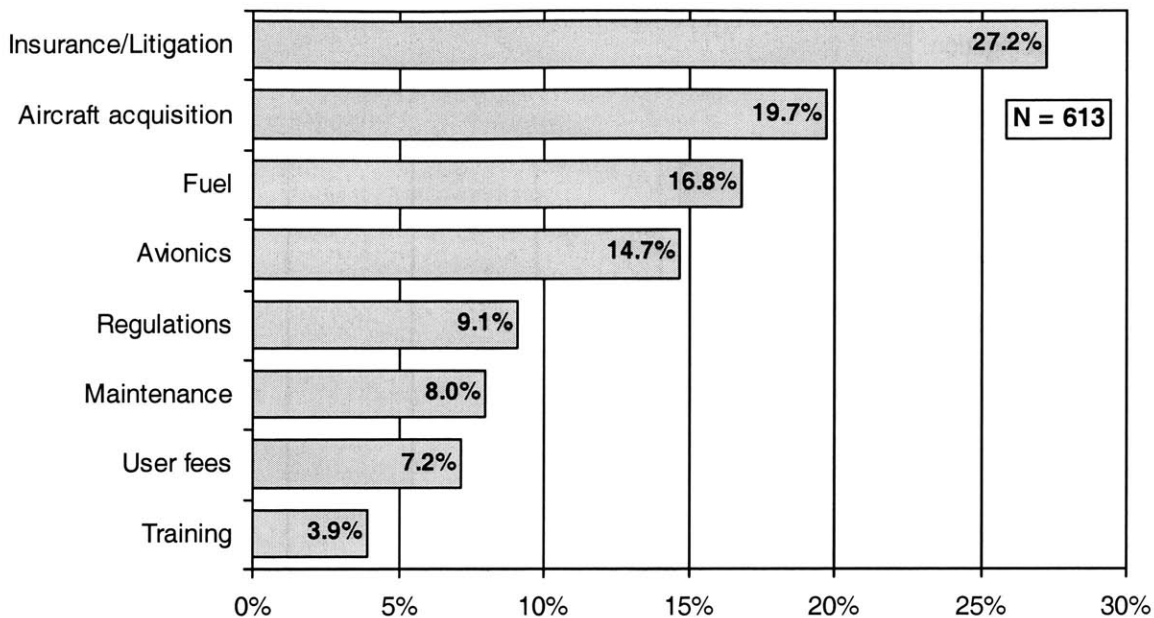


Figure 104: Q19 - Specific Areas Cited For Cost Reduction

Insurance costs were mentioned by just under 30% of those citing a reduction in costs as being important. Typically, high insurance costs were blamed on accident litigation. If tort reform was mentioned in connection with a reduction of insurance costs, it was also categorized under "Tort reform" among the other, non-cost issues.

The costs of purchasing or renting aircraft (aircraft acquisition) were included in this section, as well as high aviation fuel costs. Some also indicated that reducing the costs of state-of-the-art avionics such as TCAS, GPS and datalink was important. Further mention was made of FAA regulations increasing costs, and specifically as increasing the costs of equipment, maintenance and training. High maintenance costs (both labor and parts costs were cited) and high training costs were also noted as important potential sources for reducing costs. Reducing current user fees such as airport landing fees, and barring the introduction of new fees was also cited.

For those who indicated that they typically rent their aircraft, insurance and the costs of acquiring the aircraft (presumably rental fees) far outstripped all other cost factors (Figure 105). Among aircraft owners, insurance, fuel and avionics costs shared the top spots in sources for potential cost reductions (Figure 106).

...of those renters who said "reduce costs," specific areas cited for cost reduction:
(multiple responses per person)

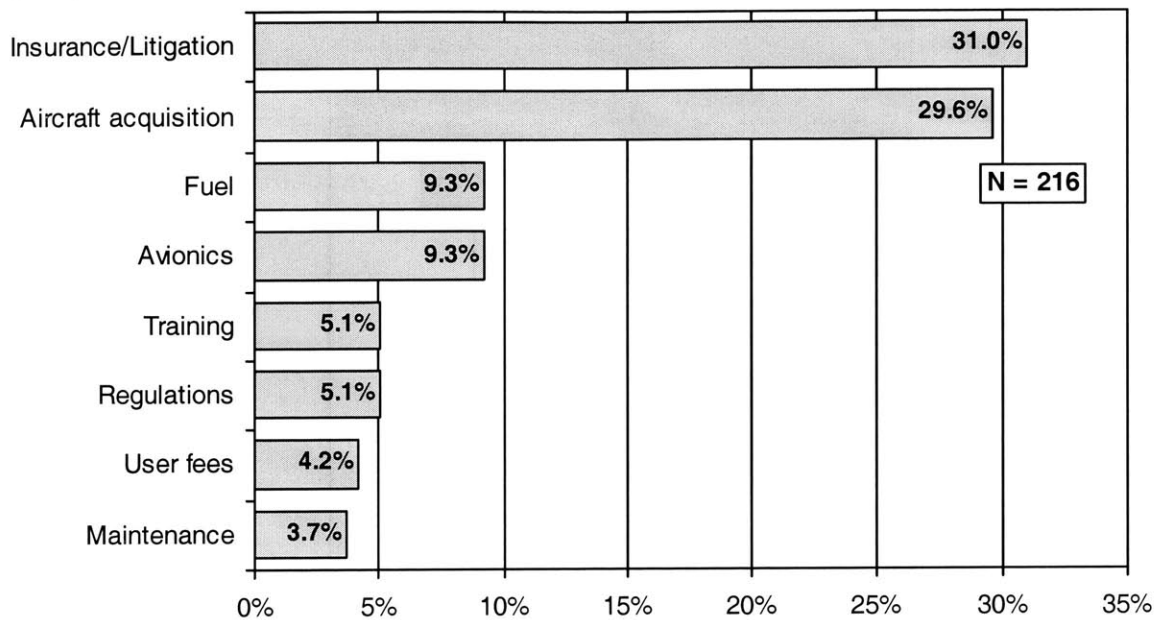


Figure 105: Q19 – (Renters) Specific Areas Cited For Cost Reduction

...of those owners who said "reduce costs," specific areas cited for cost reduction:
(multiple responses per person)

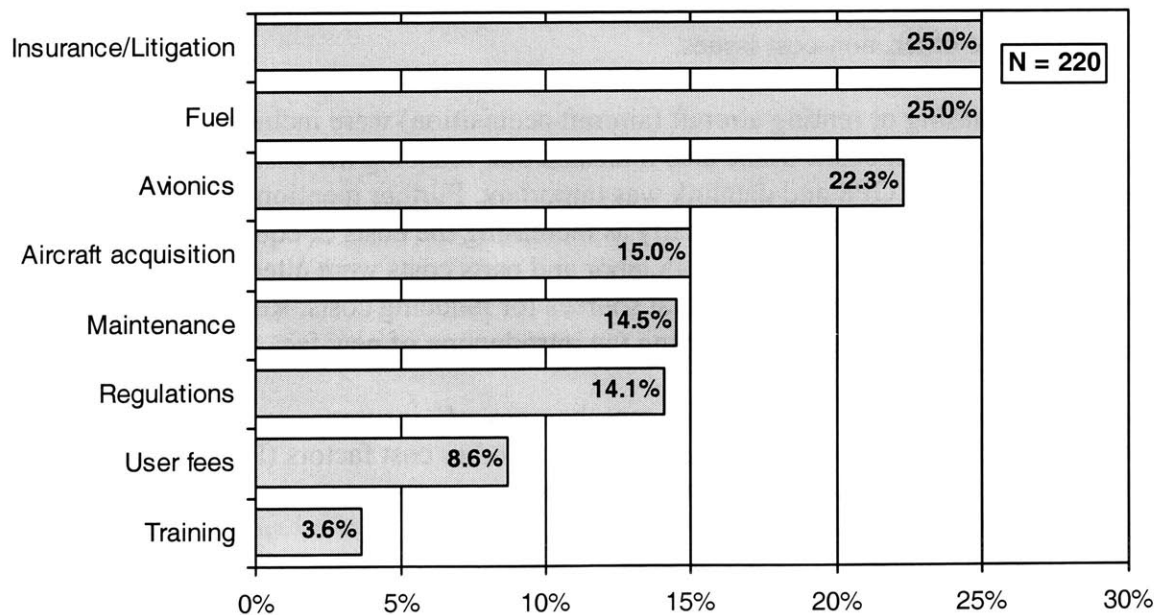


Figure 106: Q19 – (Owners) Specific Areas Cited For Cost Reduction

Reduce complexity/utilize advanced technology: Nearly 300 survey participants indicated that a reduction in the complexity of flying general aviation aircraft was important. In nearly every response it was suggested that complexity was to be reduced through greater use of advanced technology such as NASA's Highway In The Sky (HITS), decoupled flight controls, and single lever engine control. Several responses also included availability of small jet engines or fuel-injected diesel engines on GA aircraft as being an important step in reducing barriers to GA travel. It is worthwhile to briefly dwell on the issue of reducing complexity and utilizing advanced technology since this is the first time in the survey that the issue has arisen in any response.

Significant media attention has been focused on the greater use of advanced technology in smaller general aviation aircraft such as the single engine pistons that were frequently considered in this survey. Indeed, some of this advanced technology is available today or will soon be offered by major manufacturers. Cost issues related to new technology (e.g. avionics) were raised in the previous discussion on reducing costs, and the issue of expense has been cited several times previously in this survey as a barrier to the use of general aviation. This is, however, the first time that the issue of the complexity of either the act of flying or of learning to fly has been raised in this survey. It is reasonable to believe that the complexity of learning to fly discourages some people from utilizing GA for travel, but it is not possible from this survey data to determine to what extent complexity or lack of advanced technology act as barriers to entering the GA transportation system (see comments in Section 2.3 on the limitations of this survey). Furthermore, this survey data has not previously indicated that complexity or lack of advanced technology acts as a significant barrier to the active pilots already in the GA system (see responses to question 8, for example). The survey was carefully designed with free form response questions to prevent respondents from being guided in their answers to any preconceived issues. It is significant that nearly one out of four of those answering this question have raised the issue of reducing complexity through updated technology for the first time in the survey. This would suggest that increased availability and use of advanced technology may be a desire of many, but that the lack thereof is not currently a significant barrier to the use of general aviation for those who are already vested in the GA transportation system.

Build more runways/airports: Of those who responded to this question, 22.1% cited the importance of building more runways and general aviation airports, as well as keeping existing general aviation airports open. Many respondents in this category also mentioned improved access to large, commercial airports for GA as important. At the time this survey was conducted significant media attention in general aviation circles was focused on the possible closure of Meigs Field in Chicago. It is impossible to determine how that may have affected responses to this question on the survey. Convenience, often in the form of ease of access to GA transportation, has previously been mentioned as one of general aviation's advantages (question 14) as well as one of the important barriers to using GA transportation (question 8). One issue of convenience is the location of GA airports in relation to the trip origin and destination. It is consistent to see a related issue mentioned as important for reducing barriers to GA utilization.

Better weather information: Of the 19.6% of responses to this question which indicated that it is important to make better weather information available, 76.2% of those indicated that having the

information available in the cockpit during flight was important. Mention of this subject here is also consistent with previous parts of the survey where weather was most often mentioned as a major reason for choosing to not travel by general aviation aircraft (question 8). The ability to circumvent or travel through weather was an advantage frequently cited for the automobile and airline transportation modes.

Modify flight procedures: A wide variety of issues regarding some modification of flight procedures were mentioned in response to this question. Topics included in this category were modified approach procedures to certain airports or for specific classes of airspace, modified navigation procedures (the term “free flight” was sometimes used, and greater reliance on GPS navigation was often mentioned), as well as modified air traffic control (ATC) procedures in controlled airspace. The ATC procedures mentioned included better access to services such as flight following and improved communications with controllers. Several respondents also expressed concern that GA aircraft were currently regarded as “second class citizens” in the ATC system in comparison to commercial and corporate jet traffic. As with reduction in complexity, this is the first time that flight procedures has been raised as a significant issue acting as a barrier to GA utilization. In reviewing the survey data, some mentions were made in questions 6 and 8 of airspace congestion or ATC procedures acting as factors in deciding whether to travel by GA aircraft. These issues were not mentioned by 1% or more of the survey participants in either of the previous questions. Flight procedures may act as an impediment or a burden when using GA transportation, but do not appear from this survey data to act as a significant barrier to GA travel.

Improve GA airport facilities: Of those who answered that improving GA airport facilities was important, 64.5% specifically cited access to ground transportation as being the important factor. This is consistent with previous mentions of mobility at the destination airport as an important barrier to using GA transportation (questions 6 and 8).

Regulatory reform: In this category survey participants indicated that Federal Aviation Administration (FAA) regulations were acting as an important barrier to general aviation travel. In many cases it was mentioned in relation to costs, but also included requirements for maintenance, access to replacement or upgraded parts, and training. Cost issues have been raised previously in this survey, with some mention of regulatory impacts on expenses. Apart from costs, the regulatory burden has not previously been raised as an issue in deciding against GA transportation for any trips, or as an advantage of any other mode of travel. The comments received for this survey are compelling in making the argument that FAA regulations are indeed a burden for those who use GA transportation, even aside from the issues of increased costs. Based on results from previous questions on barriers (question 8) and travel mode relative advantages (questions 14, 15 and 16), one could conclude that FAA regulations are not currently acting as significant barriers to using GA transportation. However, this burden has not been adequately explored in this survey to render a final judgment on the importance of the issue in reducing the utility of GA as a form of transportation.

Tort reform: Litigation against the aviation industry was mentioned in the earlier discussion on costs as increasing the expense of flying GA. Those answers were included in this category along with other mentions of tort reform not associated with costs. As with the issue of complexity, this is the first time that tort reform has come up as an independent issue of being a barrier. Outside

of possible cost-related issues, litigation has not been indicated as a significant barrier elsewhere in the survey. Of note, a record multi-million dollar verdict was delivered in a litigation suit against a major general aviation manufacturer during the time this survey was being conducted. The award received widespread media attention, particularly in aviation-related circles, and several of those surveyed specifically cited this case as an example of the need for tort reform. It is impossible to know to what extent the verdict may have influenced responses in this survey.

Educate public/employers: Some of those responding to this question felt that an important barrier to the utility of GA travel to themselves and to the general public was a public and employer lack of knowledge of the benefits of general aviation. Some cited their explicit employer policies prohibiting GA travel, or policies implicitly prohibiting use of GA by not reimbursing GA expenses. Others cited what they felt to be misrepresentations in the media and misperceptions by the general public regarding the safety and utility of GA travel. Also mentioned as examples were closings of GA airports initiated by a nearby public disdainful of noisy aircraft flying over their houses. Raising the issue of education in this question is consistent with other issues previously seen in this survey, including costs (reimbursement for business travel), access to GA transportation (convenience), and traveling companions being unwilling to travel on GA aircraft (due to perceived safety and other concerns). Also mentioned was the need for education regarding some of the most frequently cited advantages of travel by GA, including flexibility of the mode, reduced doorstep-to-destination travel time, and the fun of flying.

Encourage/simplify pilot training: Included in this category were issues of encouraging new student pilots through programs such as the Young Eagles, and reducing the training requirements to earn a pilot's license. Suggestions were made to support new types of pilot certificates such as the recreational certificate now available, and the proposed sport pilot certificate. Issues regarding barriers to entering the GA system were not specifically addressed in this survey, so pilot training has not been adequately addressed.

Near all-weather capability: Factors included in this category included improved access (typically through reduced costs and certification requirements) to all-weather equipment such as anti-ice, plus the allowance of precision approaches using GPS and zero-zero minimums. Cost issues regarding avionics were previously addressed in the costs discussion for this question. Weather has been consistently rated as one of the top issues in acting as a barrier to using general aviation transportation. Having the issue raised by only 5.3% of those who responded to this question may indicate that there is general agreement that not much can be done about the weather issue.

Improve aircraft availability: The issue of difficulties with access to aircraft has been raised before in questions 6 and 8. It is interesting to note that the issue was not raised as frequently for this question as it was for those previous two questions. Renters cited this factor more often than the overall survey population, with 8.3% indicating that it was an important factor.

Traffic information in the cockpit: Improved access to services and equipment for traffic information in flight was mentioned in this category.

Question 20: Consider a dispatch service being made available to general aviation, offering support similar to that which is available to airlines (pre-flight planning, in-flight information and decision support, weight & balance computations, etc.). Assuming this service was also recognized by insurance companies as a way to reduce insurance premium costs, would you be interested in purchasing the service? How much would you be willing to pay per flight for the service?

(free form response)

When first drafting the survey, it was hypothesized that preflight planning and access to in-flight services might be indicated among the significant barriers to the utility of GA transportation. It was desired to know if an airline-type dispatch service might be of use to help with those aspects of travel by GA aircraft. As indicated throughout this chapter on the survey results, these factors have not emerged as significant outside of possible weather-related issues, which have been discussed.

The data from this question was separated into three broad categories: those who stated unequivocally that they would not be interested in any of the described services, those who indicated at they would definitely be interested in at least some aspects of the described services, and those who indicated that their level of interest would depend on what services were offered, or that they needed more information to answer the question.

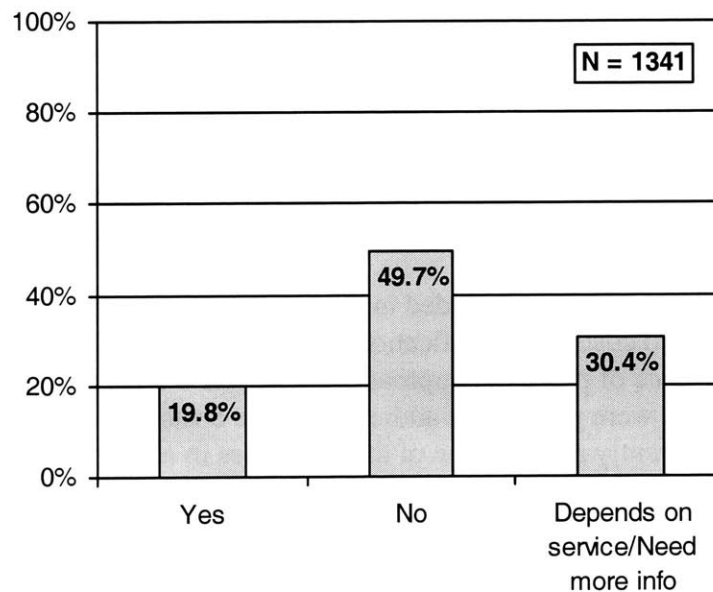


Figure 107: Q20 - Would Those Surveyed Use a Proposed Dispatch Service

As is evident from Figure 107, 49.7% stated unequivocally that they would not be interested in any of the described services while 19.8% indicated that they would definitely be interested in at least some aspects of the described services. The remaining responses indicated that the level of interest would depend on what services were offered, or that the individual needed more information to answer the question.

An exhaustive categorization of all responses was not conducted, as was with the other free-form response questions in this survey, but broad patterns did emerge from the data. Of those who said they had no interest in the proposed service, 23.2% responded that adequate pre-flight information and tools are already available for free or for a modest fee. Current services cited as being used include FAA Flight Service Station (FSS), DUATS, services via flying clubs, organizations such as AOPA, or Internet-based computer software. Considerable concern was expressed that such a dispatch service would become another user fee, or a precursor to paying for current free government services such as FSS and even ATC services. In addition, 42% of these “no” responses indicated that the individuals preferred to do the planning themselves or felt that the burden of the task should remain with the pilot-in-command. Many stressed that competent pilots should do preflight planning such as weight & balance, route planning and weather checks themselves. Most expressed distrust in anyone doing this other than themselves. Some concern was mentioned that such a proposed service would make other pilots complacent and degrade independent decision skills.

There were differing s on the adequacy of current in-flight information services such as Flight Watch, but many felt that in-flight information would be the most useful and desirable aspect of such a proposed service (40.6% of those who said “yes” or “depends”). A main desire was for accurate, affordable real-time weather information, including advisories and graphical in-flight information (25.2% of those who said “yes” or “depends”). The desire for more weather information is quite consistent with earlier portions of the survey that have identified weather as one of the top barriers to utilizing GA transportation.

It was mentioned in the question statement that the dispatch service might be recognized as a way to reduce insurance premium costs. In general, those who responded to this question were only willing to pay an amount for the service up to any possible savings on insurance. This desire for a zero net cost is also consistent with earlier indications that current costs are already acting as a significant barrier to GA utility. Most of those responding expressed skepticism that any such service could reduce insurance premiums.

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3 MODE CHOICE MODEL

A simple model was developed to aid in understanding the relationship between travel mode cost and speed, as well as travel distance, and to analyze their impacts on travel mode choice. This model will be used in Chapter 4 to further study issues raised in the pilot survey of Chapter 2. In this chapter the theory behind the development of the mode choice model will first be discussed, followed by a detailed explanation of the model implementation.

3.1 Theory

Traveler preferences are considered in this mode choice model as they are influenced by the relationship of speed (or time) and price. Transportation studies have indicated that the utility a traveler derives from a transportation mode is directly related to the traveling time involved. Unfortunately, utility is not a concept easily measured on a cardinal scale, so time is instead used as a factor that influences the total price of a trip to the traveler. As a scarce resource, time commands a positive price, thus causing the traveler to prefer faster modes of transportation for any given trip, all other factors being equal. In comparing various transportation modes, both fare differentials and time differentials between the modes will increase with distance. Studies by Gronau (1970) indicate that, in comparing conventional ground and air transportation modes, the time differential increases faster than the fare differential, resulting in an increased tendency to shift to a faster mode of transportation as the trip distance increases. This same tendency will be observed in this research when comparing the automobile, general aviation and commercial airline transportation modes.

The total price of a trip via any given transportation mode will be treated as a linear combination of the direct cost (dollars) and the elapsed time (hours) multiplied by the traveler's value of time (VOT, dollars/hour):

$$P_{\text{total}} = \text{Cost} + \text{Time} \cdot \text{VOT} \quad [\text{dollars}]$$

Note that the units used here are those convenient for this analysis, and may be changed as long as they remain consistent (e.g. cents, hour, and cents/hour).

The direct cost may include factors such as the purchase price for the mode (e.g. an airline ticket), the cost of fuel, parking, meals, hotel stays and any other monetary costs incurred while traveling en route to the destination.

The elapsed time includes not only the en route travel time (e.g. gate-to-gate airline travel time) but also time spent in preparing for and concluding the trip. For example, the time spent fueling a car, eating a meal, driving to an airport, checking baggage, and hailing a taxi would all be considered in the elapsed travel time for any given trip. This time is often referred to as the total doorstep-to-destination travel time.

The traveler's value of time is an equivalent monetary value assigned to a unit of time (e.g. \$20 an hour). The value of time will, as one might imagine, vary among individuals and even vary for one individual with the time of day and activities at hand. One may value time more highly

during the day at work than in the evenings at home, or vice versa. Time may be of greater value when one is late for a meeting than when one is early. The CEO of a Fortune 500 company may be considered to have a higher value of time than a graduate student. Lacking a clear standard, many economists tend to think of an individual's value of time as equivalent to their hourly wage earnings (Gronau, 1970). A precise method for assigning a value of time to any particular traveler is of secondary importance in this research, and therefore will not be considered. The utility of a transportation mode to a specific individual will not be studied. The mode choice model will instead be used to indicate how the relationship of time and price affect the utility of transportation modes relative to each other, with the value of time treated parametrically.

With this model in mind, the prices of traveling by different modes may be directly compared. The point at which the traveler is indifferent between two transportation modes is when the total price of the modes is equal:

$$C_{\text{mode A}} + T_{\text{mode A}} \cdot \text{VOT} = C_{\text{mode B}} + T_{\text{mode B}} \cdot \text{VOT}$$

Treating the traveler's value of time parametrically, the mode choice model then determines the VOT at which the traveler is indifferent between the two modes:

$$\text{VOT} = \frac{C_{\text{mode A}} - C_{\text{mode B}}}{T_{\text{mode B}} - T_{\text{mode A}}} \quad [\text{dollars/hour}]$$

Since both the total costs and total time vary with travel distance, the VOT for indifference between two modes varies with travel distance as well. For example, if the costs and time for travel by Mode A and Mode B are as shown in Figure 108, then the VOT for indifference between the two modes is that shown in Figure 109. Note that Mode B, although the faster of the two modes, is the more expensive transportation mode. It is simple to show that, for a given VOT greater than approximately \$45/hour, Mode B is the preferred transportation choice at greater distances due to its lower overall price of travel. As shown by Gronau (1970) the preference with increasing distance is for faster transportation modes.

In this model, travel costs and time are for one-way travel only from the origin to the destination. Total doorstep-to-destination travel time and costs are considered. For example, costs at the destination such as hotel and meals should not be considered as they are independent of the travel mode. One may argue that time spent at the destination might be dependent on the travel mode (e.g. airline schedules necessitate an overnight hotel stay). In these cases the mode choice model may be adjusted accordingly. The affect of travel time on mode choice will be discussed further in Section 4.2.4.

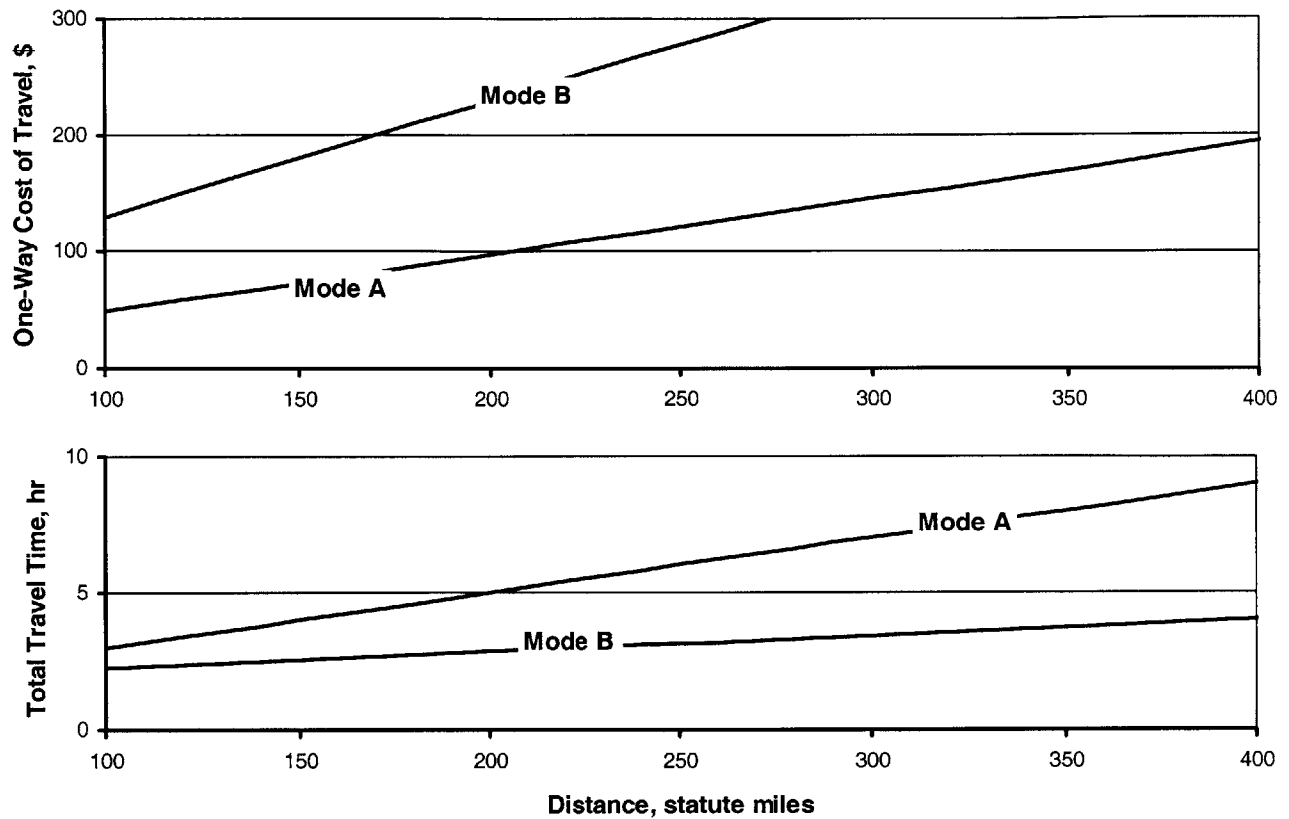


Figure 108: Total Cost and Travel Time for Two Sample Modes

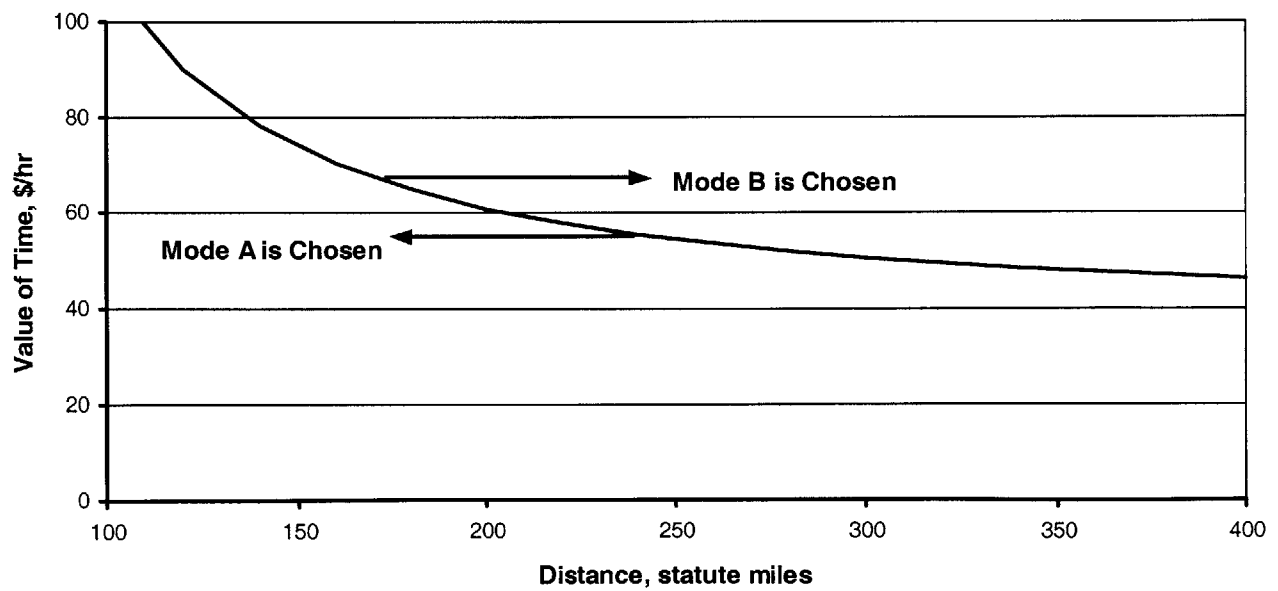


Figure 109: Mode Choice Model Results for Two Sample Modes

Indifference lines may be determined for several modes and directly compared, as shown in Figure 110 for a sample comparison of automobile, commercial airline and general aviation (GA) modes. The light gray lines (also with text superimposed over them) indicate areas where the indifference line is irrelevant and may be erased. For example, at a VOT of \$80/hour the GA mode become preferable to the automobile at approximately 140 miles. The indifference line between the automobile and the airline at 185 miles is then irrelevant since the traveler is now making a choice between GA and the airline. The traveler transitions to the airline at approximately 210 miles and will prefer that mode for all greater travel distances. The final form of Figure 110 is shown in Figure 118, where it is used as a baseline for later comparisons.

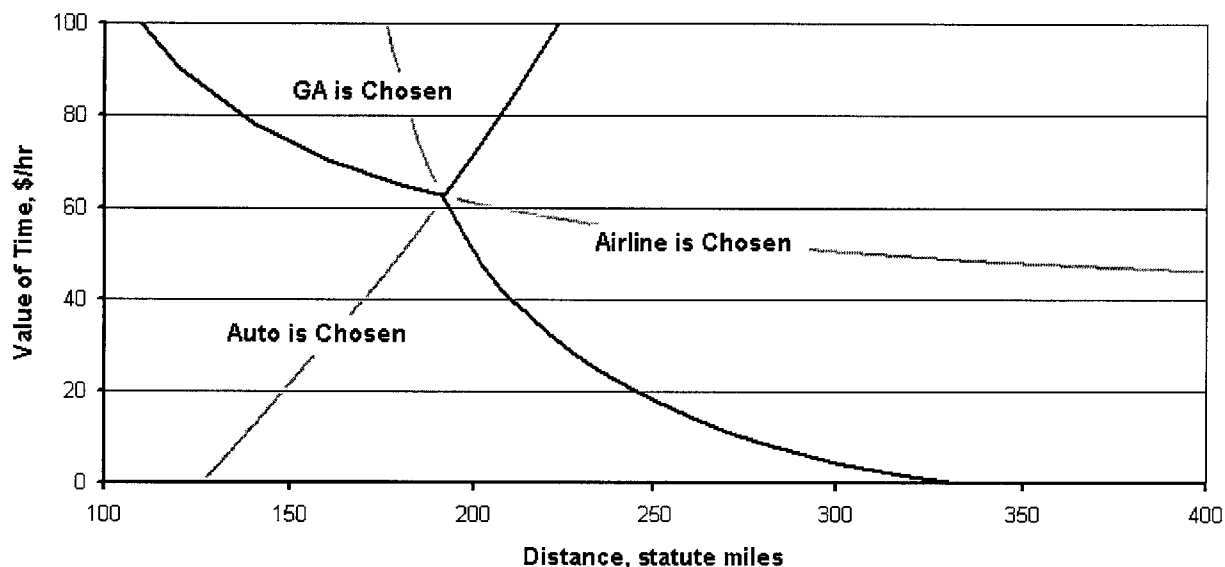


Figure 110: Mode Choice Model Results for Three Sample Travel Modes

The mode choice model, as used here, is only valid for rational decision makers. All decisions are based on factors that have been assigned a monetary value (e.g. time). Additional decision factors such as safety, inconvenience, etc. are not considered with this model.

3.2 Model Implementation

The three major travel modes identified in the survey (Section 2.4.3) will be developed for the mode choice model in this section. The cost and time variables associated with the automobile, commercial airlines, and general aviation will be established, followed by an example implementation of the mode choice model which will later be used as the baseline model for analysis in Chapter 4. In several instances, statistical data was not available for a particular transportation mode variable, or the data at hand was suspect. In these cases the variable will be noted as best being treated in a parametric manner, enabling the sensitivity of the total model to changes in the variable to be studied.

3.2.1 Automobile Cost and Time

The mode choice model was to be used to study the impacts of both the perceived and actual automobile travel costs. These costs were therefore developed in two different ways.

The perceived costs to drive 100 statute miles were ascertained in the GA pilot survey (see Section 2.4.3, question 18). As a first order approximation, this cost (\$25) was divided by 100 miles to arrive at a 25 cents-per-mile perceived cost of driving an automobile. For the moment ignoring other costs associated with driving, the cost is then linear with distance

$$C_{\text{auto}} = 25 \cdot (\text{distance driven}) \text{ [cents]}$$

A second method was also used to try to more accurately determine the true costs for driving a generic mid-sized car. Costs were divided into fixed and variable costs, both on a cents-per-mile basis. Data for the variable costs to drive an intermediate sized car was obtained from the American Automobile Association (AAA), as compiled by the American Automobile Manufacturers Association in the latest year available (AAMA, 1998). The total variable cost, and the components of the cost, are shown in Table V.

Table V: Variable Costs of Driving an Intermediate Sized Car

Gas & oil	6.60	cents/mile
Maintenance	2.80	cents/mile
Tires	1.40	cents/mile
Total Variable Cost	10.80	cents/mile

Fixed costs were estimated by AAA at \$4,403 annually for the same intermediate sized car, including the costs of insurance, registration, taxes, license, depreciation, and financing. Since the average number of trips of over 100 statute miles taken per car each year was not available, the fixed costs were instead distributed over the average annual miles put on cars each year. The US Federal Highway Administration (US FHWA, 2000) estimates that 11,700 miles were driven annually by the average car in the latest year available, 1998. The fixed costs were then distributed evenly over these miles to arrive at a fixed cost of 37.63 cents-per-mile.

Ignoring other costs for the moment, the cost of driving an automobile is then linear with distance

$$C_{\text{auto}} = (10.80 + 37.63) \cdot (\text{distance driven}) \text{ [cents]}$$

In a manner similar to costs, the driving time for a given trip was also divided into fixed and variable times. Fixed time may include factors such driving from the trip origin (a house or place of business) to the highway entrance (and conversely, from the highway exit to the trip destination), putting gas in the car on the way to the highway, and routine preventative measures such as airing up the tires and checking basic automobile fluid levels before a trip (oil, coolant, windshield cleaner, etc.). Fixed time should account for the total time involved with both origin and destination factors. Fixed time should be any time spent preparing for, or concluding, a trip that is not affected by the trip distance or duration. The fixed time for any given trip may vary

widely for different individuals and travel purposes, and thus should be treated parametrically for comparisons of the automobile to other modes of travel.

Variable time is then dependent on the distance of the trip. For the purposes of this model it was simply estimated as the trip distance divided by the effective travel speed. For highway driving in the United States the effective speed was estimated at 50 miles per hour, accounting for the degree of circuitry of the trip. The degree of circuitry is considered due to the fact that straight-line distances cannot typically be driven between the trip origin and destination. Since this effective speed is, arguably, uncertain it would be beneficial to study the impact of its selection on the model results.

Total trip time is then determined using

$$T_{\text{auto}} = T_{\text{fixed}} + \frac{(\text{distance driven})}{(\text{effective speed})} \quad [\text{hours}]$$

As a reminder, the times used here should account for one-way trip times only.

Additional levels of realism in travel costs and time may be added to the model to account for meal stops and overnight hotel stops while en route (see Section 4.2.2 for an example). Note that hotel and other costs at the destination should not be considered as they would need to be paid regardless of the transportation mode.

3.2.2 Commercial Airline Cost and Time

As with the automobile, the travel cost and time for any given trip on a commercial airline was divided into variable and fixed components.

Fixed costs include costs independent of trip distance such as car parking at the airport and taxi or rental car costs at the destination. Since actual fixed costs may vary widely depending on the trip purpose or the individual traveling, this factor should be varied to demonstrate the travel mode choice sensitivity to costs.

Variable costs were considered as the airline ticket purchase price. Fares for major airlines were researched by visiting the airlines' respective web sites in July, 2001 and pricing tickets for travel between various city pairs. All of the city pairs used were listed in the top 1000 airline travel origin and destination pairs available from O&DPlus+ software (O&DPlus+, 2000), the primary source for which is the Department of Transportation Origin and Destination Survey. All fares used in this model are for one-way trips, based on a round-trip ticket price, 30-day advanced purchase, coach class, non-refundable and including a Saturday night stay. Special low-cost fares were avoided such as internet specials, "super-saver" deals, etc. The airline ticket price was then divided by the trip distance, in statute miles, to arrive at a cents-per-mile ticket price for various trip distances, as shown in Figure 111.

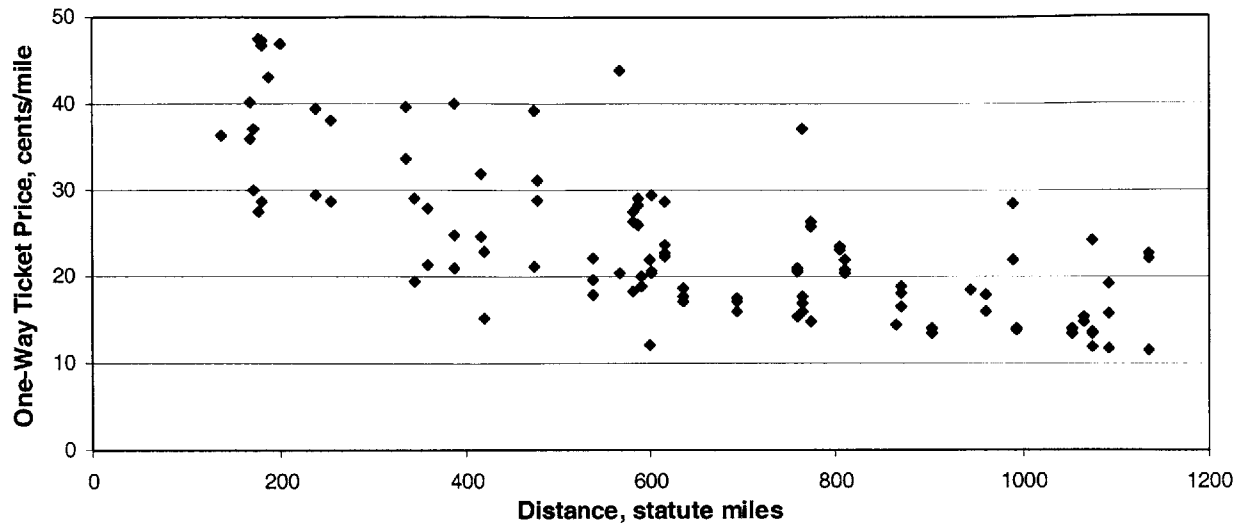


Figure 111: Major Airline Ticket Prices per Mile, July 2001

As is clear from the figure, there is a great deal of variation in ticket prices at any given trip distance. This is due to pricing variations among different airlines as well as which particular city pair is under consideration. For example, at a trip distance of 600 statute miles ticket prices for four city pairs may have been researched for three different airlines. Two of the city pairs may have included major hubs for some of the airlines, which typically reduced the ticket prices for those airlines. The other two city pairs may have both included non-hub origin to non-hub destination travel, which typically resulted in higher fares for those trips. In addition, some of those city pairs may have included popular travel destinations for business or leisure travelers (e.g. Boston, MA or Orlando, FL, respectively), which also affected the ticket price. There was initially some concern that low-fare air carriers were distorting the true cost of airline travel in this research. The fares from specific carriers were isolated, and it was found that no one particular carrier had ticket prices atypical of the norm. For example, Figure 112 shows the fares from Southwest Airlines in relation to the other carriers and indicates that this particular carrier is not biasing the overall data. It is interesting to note that, for the particular city pair a low-fare carrier may serve, that carrier may indeed be the local price leader. However, since many of these low-fare carriers are operating in markets that are underserved by the major airlines, fares between these city pairs may still remain higher than between other city pairs with equivalent travel distance in which major airlines are competing. For this reason, when looking at the overall picture with multiple city pairs at each travel distance, low fare carriers did not distort the cost of airline travel.

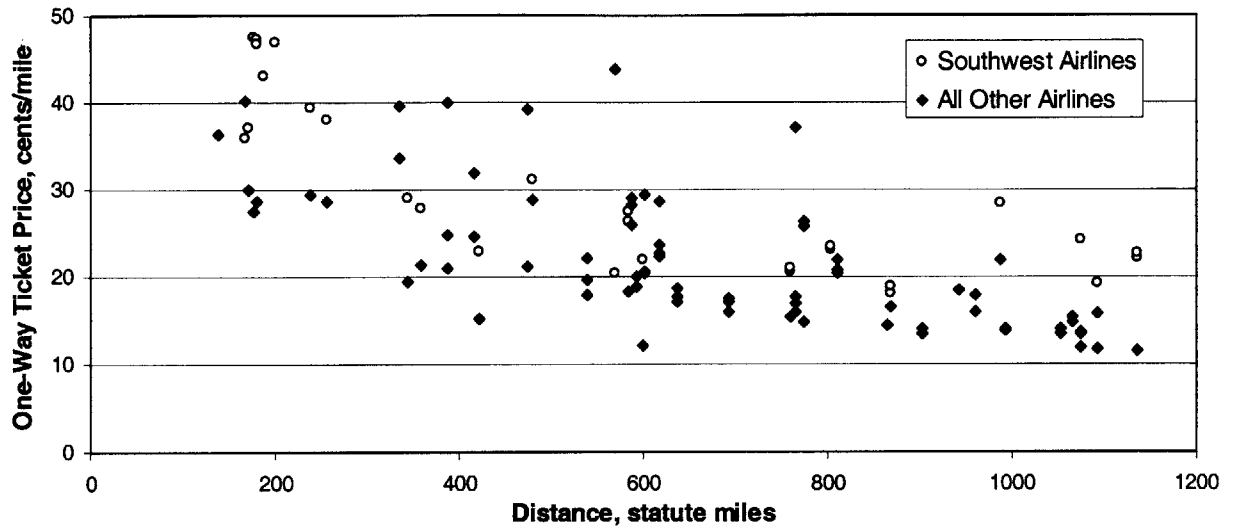


Figure 112: Impact of Low Fare Carriers on Ticket Prices per Mile

A curve was fit to the fare data representing the optimistic low fare available for airline travel at any particular trip distance (Figure 113). Depending on how the mode choice model is used, this curve may be shifted up to higher ticket prices to demonstrate sensitivity of mode choice to ticket prices. It is interesting to note that airline fares, in terms of cost per mile traveled, increase for shorter travel distances. This may be attributed to that fact that airlines have fixed operating expenses that must be paid regardless of the distance traveled.

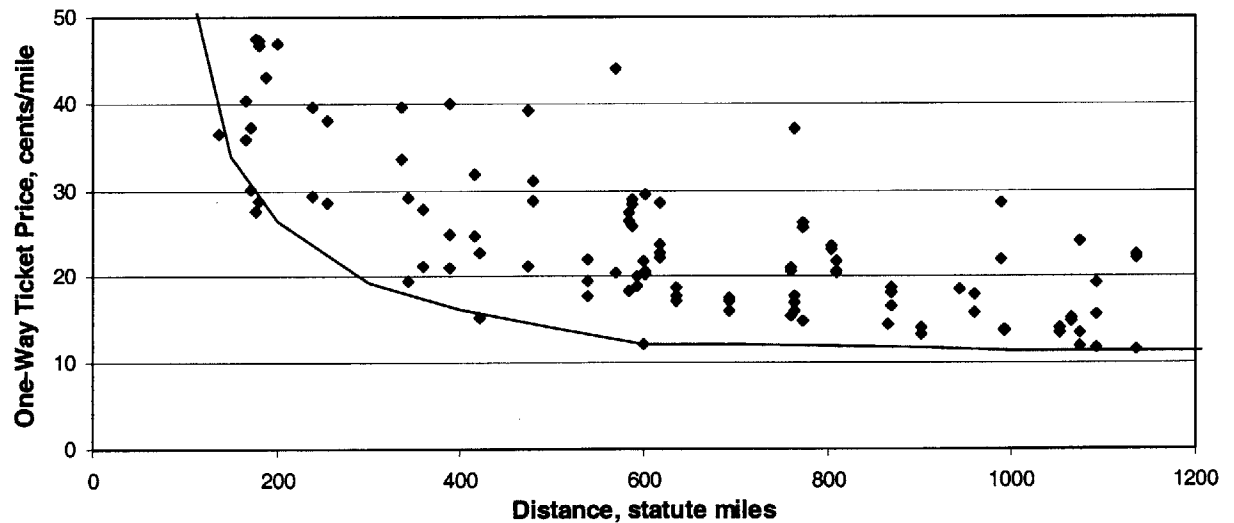


Figure 113: Optimistic (Lowest Fare) Curve for Airline Ticket Prices per Mile

Total costs for airline travel are then

$$C_{\text{airline}} = C_{\text{fixed}} + C_{\text{ticket}} \cdot (\text{distance flown}) \text{ [cents]}$$

where C_{ticket} is also a function of the distance flown.

Fixed travel time was considered as the time spent traveling which is independent of trip distance. This may include time driving from the travel origin to a commercial airport, time at the airport checking baggage and waiting for boarding, and time spent at the destination renting a car and driving from the airport to the final travel destination. The 1995 American Travel Survey, conducted by the U.S. Bureau of Transportation Statistics (US BTS, 1997), provides data that indicates the median distance Americans travel in a car to reach a commercial airport is 24 miles. If one estimates an effective in-city travel speed of 40 mph, this equates to approximately 1.2 hours spent traveling to and from commercial airports for each trip. Additional anecdotal evidence is available (Agur, 1999) to approximate time spent at the airport at 45 minutes each way (arriving and departing the airport), or 1.5 hours for the total trip. Total fixed time may be estimated at approximately 3 hours using this data. Note that it is likely that the time spent at commercial airports has changed significantly since the September 11, 2001 terrorist attacks, and it is therefore appropriate to consider the sensitivity of mode choice to total airline travel time.

Variable travel time was considered as the gate-to-gate time published by the respective airlines for the city pair under consideration (Figure 114). This data was collected at the same time the fare data was researched, as described above. As with the airline fare information, there is considerable variation in the gate-to-gate travel times for any given trip distance. The larger differences may be attributed to the degree of circuitry of the travel. Travel between any given city pair may include intermediate stops (routing through a hub, for example), which considerably increase the origin-to-destination travel time. An additional factor is the type of equipment used by the airlines on any given route. Jet aircraft cruise speeds are higher than turboprop driven aircraft, and cruise speeds even vary among jet aircraft.

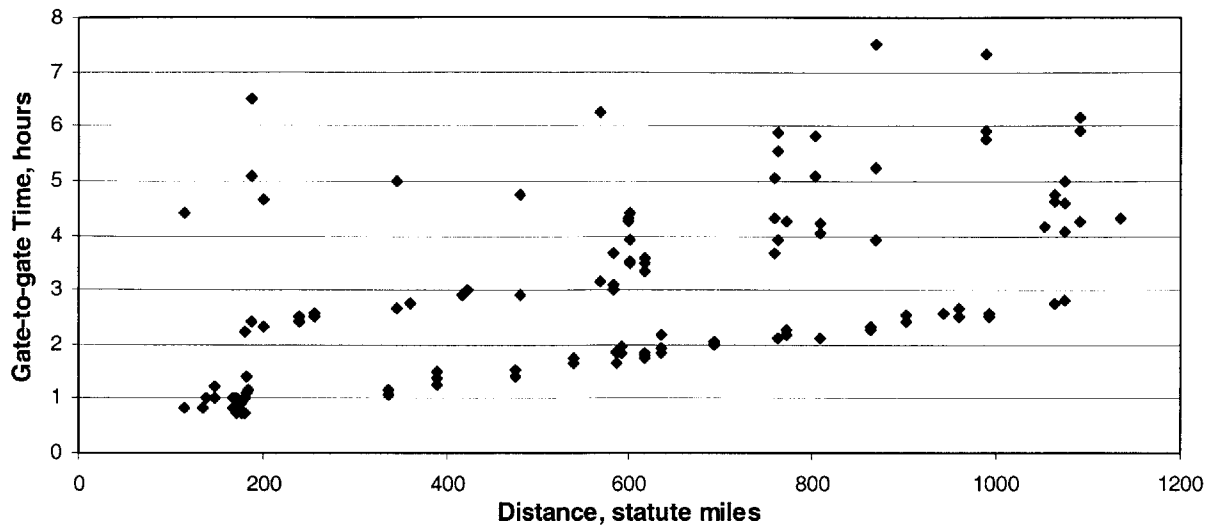


Figure 114: Gate-to-gate Travel Times Published by Major Airlines

Particular carriers were again isolated to ensure that the overall data was not distorted by any one single carrier. For example, Figure 115 shows again Southwest Airlines which, in its market, often has the only direct routing available between city pairs. No one carrier, however, appeared to distort the overall en route travel time data.

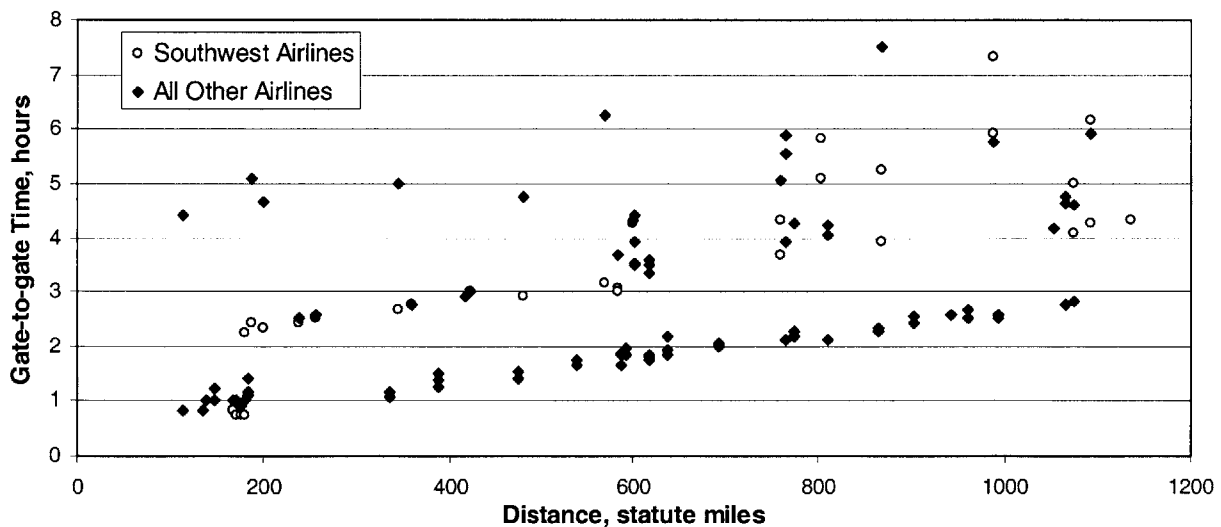


Figure 115: Impact of Low Fare Carriers on Gate-to-gate Travel Times

A linear curve was fit to the travel time data to represent the optimistic (shortest) travel time available on a commercial airline for any given travel distance (Figure 116). Depending on how the mode choice model is used, this line may be shifted up to demonstrate the sensitivity of travel mode choice to airline en route travel time.

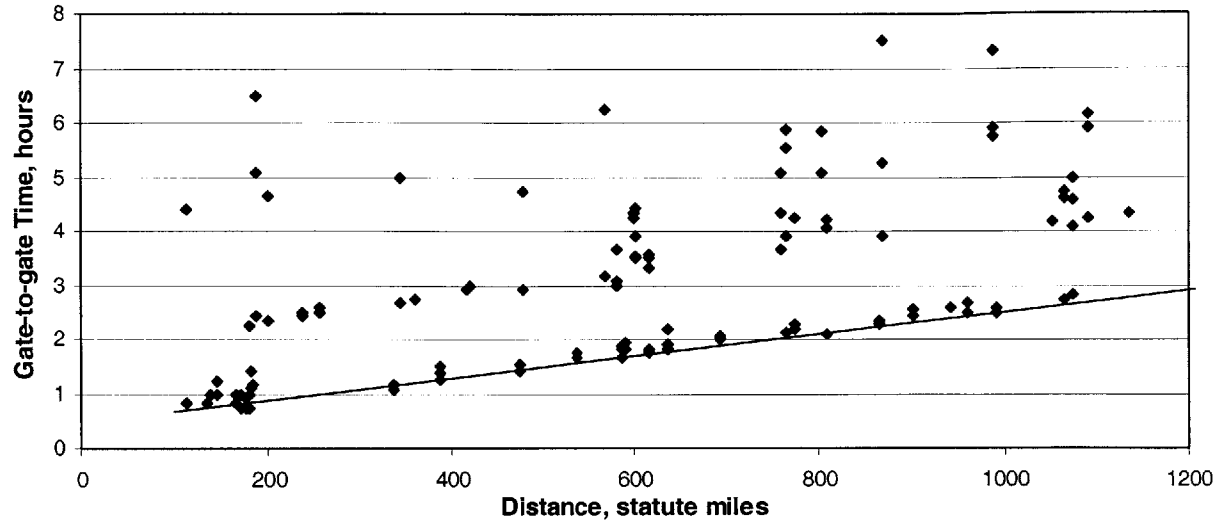


Figure 116: Optimistic (Shortest) Curve for Airline Gate-to-gate Travel Times

Total travel time is then calculated as

$$T_{\text{airline}} = T_{\text{fixed}} + T_{\text{gate-to-gate}} \quad [\text{hours}]$$

where $T_{\text{gate-to-gate}}$ is a function of travel distance.

3.2.3 General Aviation Cost and Time

The cost and time in traveling by general aviation aircraft were handled in the mode choice model in the same manner as the automobile and airline. Costs and time were divided into fixed and variable components, which were then added in a linear fashion to arrive at total cost and total time for travel at various trip distances. However, since the focus of this model is to study the utility of GA aircraft, these costs and travel times will be treated in a largely parametric manner. Depending on how the mode choice model is used, the GA travel costs and time will be varied to study the sensitivity of mode choice to these factors.

The manner in which GA travel costs were handled for any particular study will be explained in the appropriate section in Chapter 4. Representative fixed and variable costs were estimated for single engine and twin engine GA aircraft for use in the model. A baseline mode will be developed using these costs in the next section, and the derivation of these representative costs is shown in Appendix C.

Fixed GA travel time may include factors such as driving to a local GA airport and conducting preflight checks on the aircraft. Values used for this parameter will be set in the baseline model developed in the next section, but a sensitivity analysis on the fixed time would also be appropriate.

Variable GA travel time, or the actual en route “block time,” was calculated based on the aircraft cruise speed (Figure 117). This block time was estimated using methods of Roskam (1990)

which include allowances for ground maneuvering, climb to altitude, cruise, descent and post flight taxing and shut down. The time to enplane/deplane and perform the aircraft walk-around in these calculations was set to zero and instead book-kept under fixed travel time. Since the GA aircraft cruise speed is highly dependent on the type of aircraft considered, it will be appropriate to study the sensitivity of mode choice to this parameter (see Section 4.2.4).

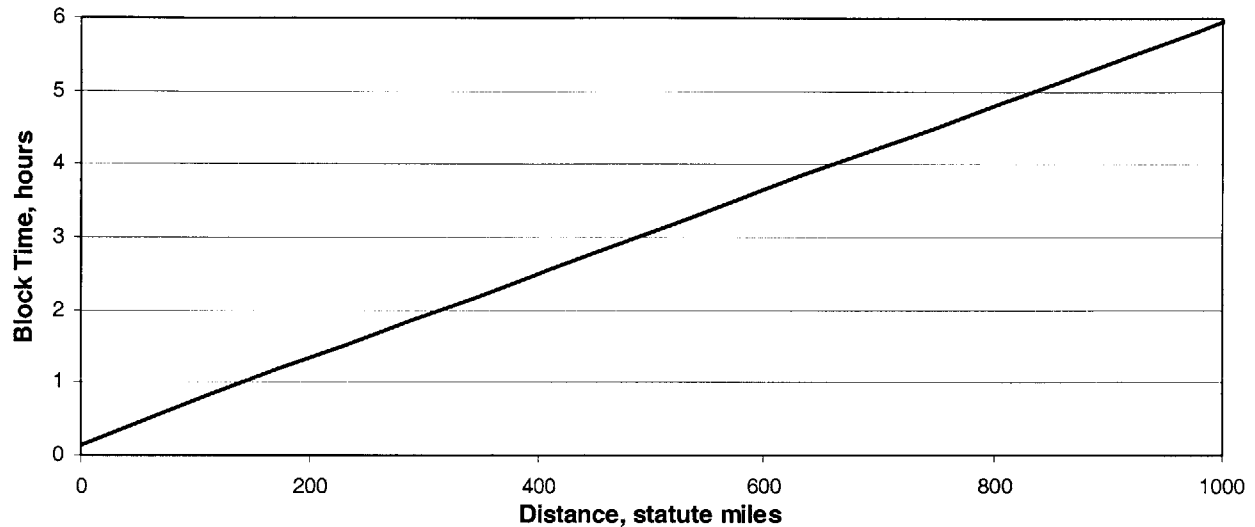


Figure 117: Block Time for A General Aviation Aircraft with A 160 knot Cruise Speed

Total travel time is then

$$T_{GA} = T_{fixed} + T_{block}$$

where T_{block} is a function of the distance traveled.

No degree of circuitry has been explicitly accounted for in these calculations of travel time. One could decrease the aircraft cruise speed to arrive at an effective cruise speed, similar to the method used for the automobile effective speed. One could also argue that general aviation aircraft (or at least some types of GA aircraft) should have very little circuitry on any given trip due to greater freedoms in route planning, especially under VFR conditions. For purposes of this model, the aircraft cruise speed assumptions will be clearly noted for analysis and then adjustments, if any, may be made by the reader to account for the degree of circuitry.

An additional level of realism in travel time may be added to the model if refueling stops are added at the GA aircraft range limits. Additional factors such as this would render the GA aircraft relatively less attractive than the airline at longer travel distances. For the purposes of this study it will be assumed that the aircraft under consideration has an unrefueled range of at least 400 statute miles (approximately 348 nautical miles).

3.2.4 Mode Choice

Travel costs and time for the three primary modes of interest (automobile, airline and general aviation) were utilized to study the mode preferences as they vary with travel distance. A

baseline mode choice model will be constructed in this section to demonstrate the mechanics of the method and how travel time and costs relate to the mode choices.

The AAA-based automobile costs discussed in Section 3.2.1 will be used for this example. An effective automobile speed of 50 mph will also be used along with a fixed time of one hour to account for approximately 30 minutes of highway access time at the origin and destination. For simplicity, no additional costs or time due to meal stops or overnight hotel stays will be considered.

The total fixed costs for airline travel will be estimated at \$100 for this example to account for parking charges, taxi costs at the destination and other fixed expenses. Total fixed time will be set at 3 hours as discussed in Section 3.2.2. The most optimistic curve fits will be used for the airline variable travel costs and time, as shown in Figure 113 and Figure 116, respectively.

For the purposes of this example, GA aircraft fixed and variable costs will be set at \$100/hour and \$70/hour, respectively. These costs were estimated for a small, single engine piston aircraft wholly owned by one individual (see Appendix C for the derivation of these costs). Fixed travel time is set at 1.5 hours, including 30 minutes driving each way to and from a local GA airport plus another 30 minutes at the airport for pre- and post-flight activities. Variable time is based on a 160 kt cruise speed (Figure 117), typical for mid-performance single engine piston aircraft such as a Cirrus SR20 or Piper Saratoga II (*Business & Commercial Aviation*, May 2000).

The results of the model calculations for the cost of travel, travel time, and the mode choice are shown in Figure 118. As expected, the automobile is the dominant mode of choice at short distances and for individuals with lower values of time (VOT). Although the automobile is only faster than the airline for travel distances less than approximately 150 miles in this case, it is significantly less expensive than the airline. Expense offsets the airline speed advantage until a travel distance of approximately 200 miles, at which distance the airline is chosen over the automobile for a VOT of \$60/hour. Note that for travel distances beyond approximately 340 miles the automobile loses its cost advantage and there is no longer a reason for anyone in this model to travel by automobile, regardless of their VOT.

Travel by GA is always more expensive than by airline (except for very short distances) in this example, but the shorter travel time gives GA an advantage at certain ranges for those travelers with a VOT higher than \$60/hour.

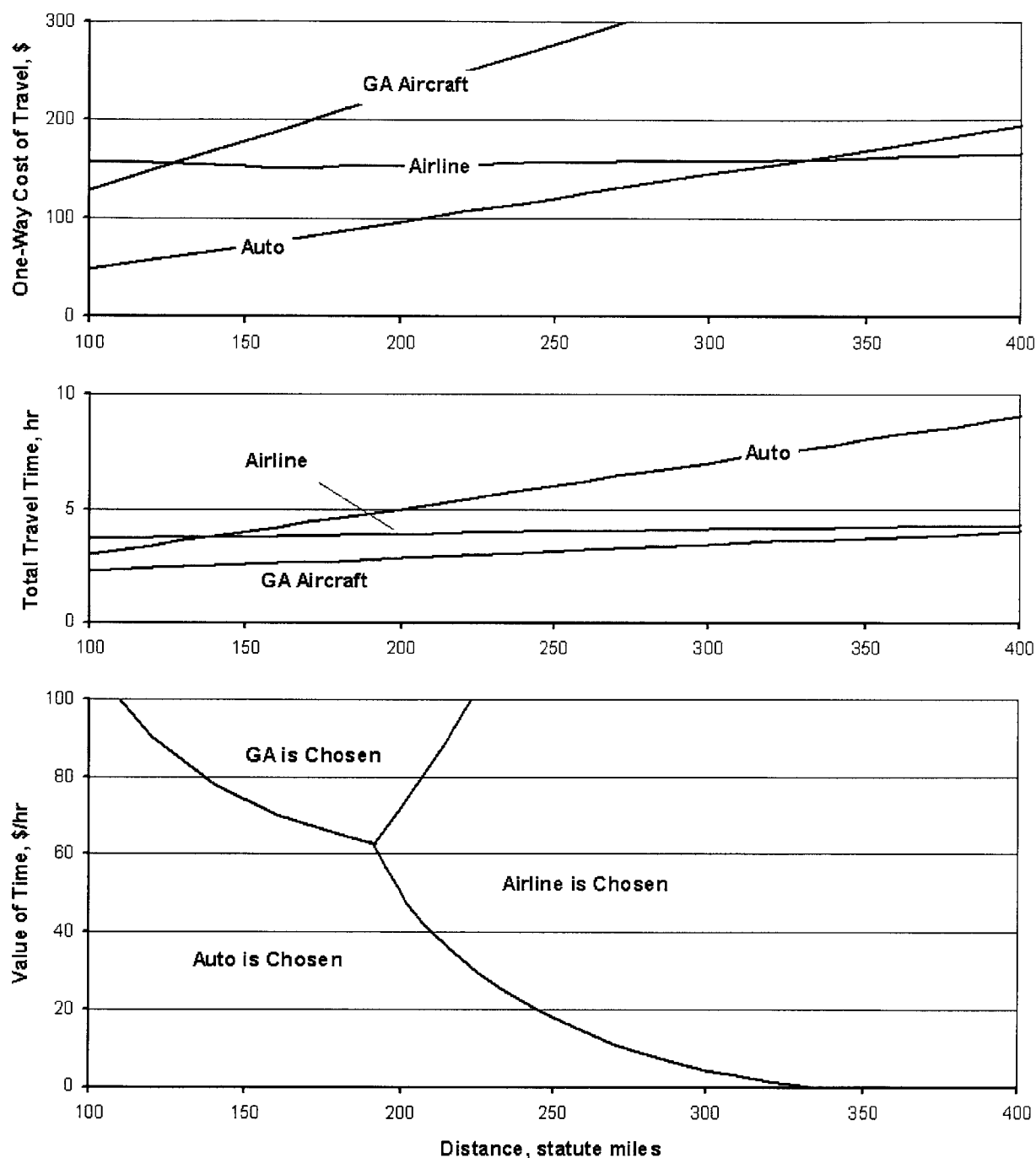


Figure 118: Baseline Cost, Travel Time, and Mode Choice Model

In short, this particular model formulation indicates that an individual with a VOT of \$80/hour would choose to travel by automobile for trips up to approximately 140 miles in distance. Single engine piston GA aircraft would be the mode of choice beyond 140 miles but shorter than approximately 210 miles, at which time the airline becomes the preferred mode. For an individual with a VOT of \$20/hour, the automobile would be the mode of choice up to trip

distances of approximately 245 miles, at which time the airlines would be chosen. The GA aircraft would never be a mode of choice for a VOT of \$20/hour according to this model.

The results shown in Figure 118 will be the baseline cost, time, and mode choice model used for comparison in the studies in Section 4.2.

It was mentioned in Section 3.2.1 that the automobile effective speed and fixed time should be treated parametrically since exact values may differ with trip purpose, destination and with the individual traveler. In Figure 119 the effect of varying the effective automobile speed $\pm 10\%$ is shown. A faster effective automobile speed (less circuitry or higher highway speeds) reduces the area over which both GA and airline transportation are the preferred modes.

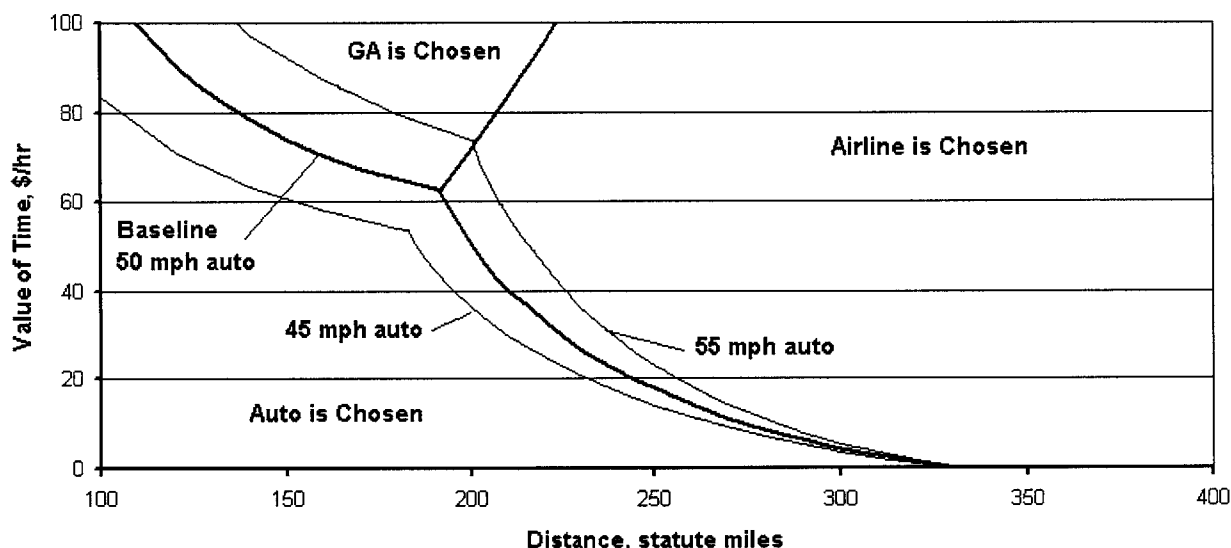


Figure 119: Effect of Automobile Effective Speed on Mode Choice

The fixed time associated with automobile travel was also varied, reduced from the baseline 1 hour (30 minutes at the origin and 30 minutes at the destination) to a total of 30 minutes and increased to a total of 1.5 hours. In Figure 120 it is clear that the utility of GA travel can be significantly affected by the assumption of fixed time in automobile travel.

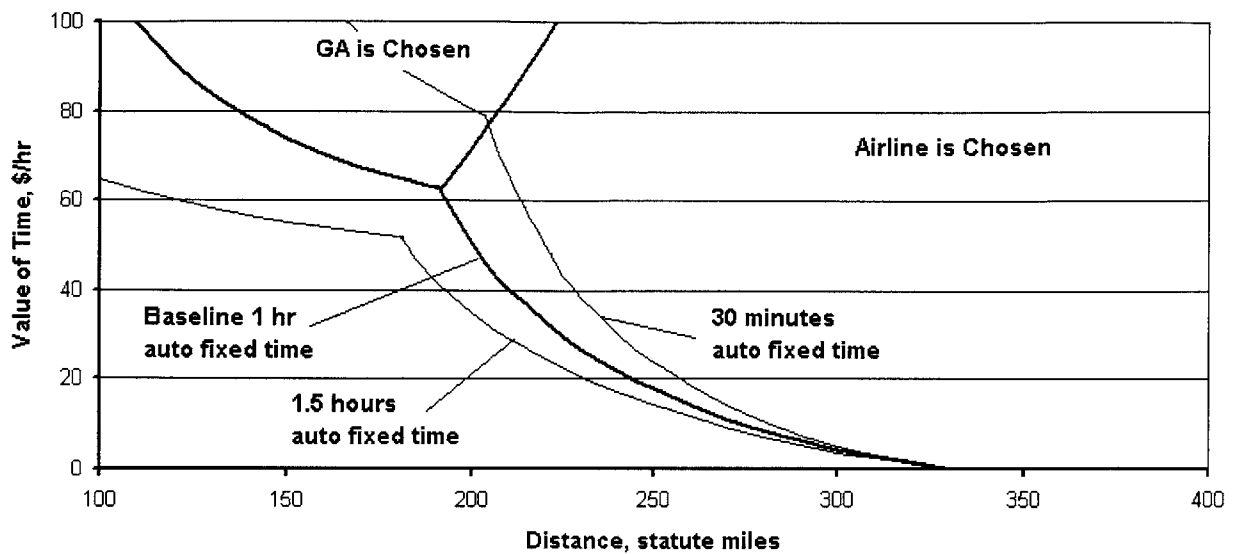


Figure 120: Effect of Automobile Fixed Time on Mode Choice

The airline fixed costs were also varied from the \$100 used in the baseline model to show the model sensitivity to this variable. Figure 121 indicates the effect of changing airline fixed costs by $\pm \$50$. Airline fixed costs can significantly alter the limits for preferable auto and GA travel.

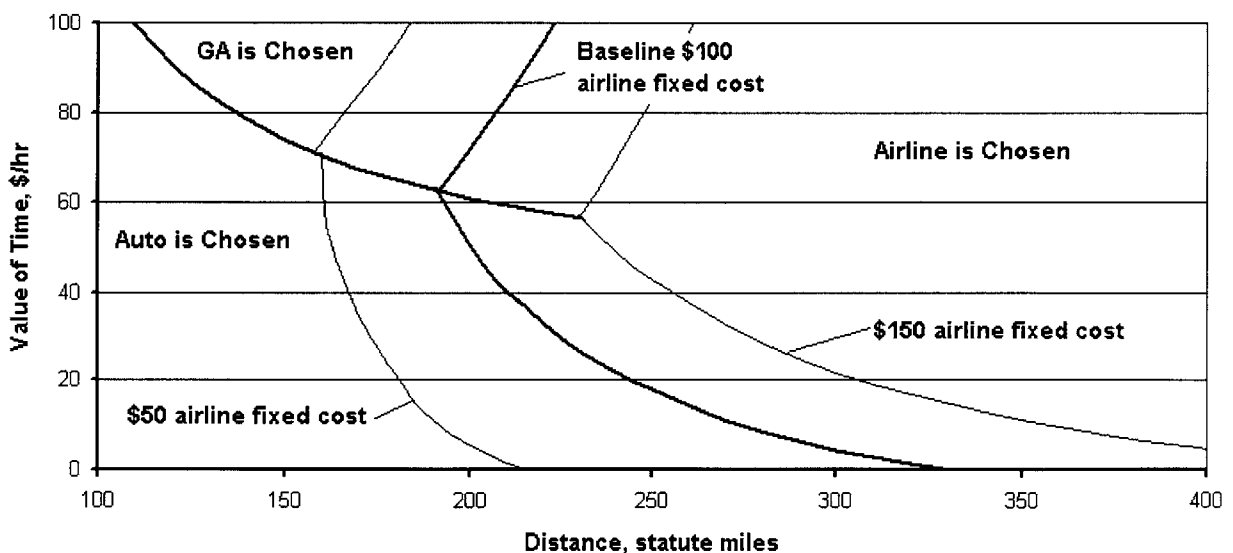


Figure 121: Effect of Airline Fixed Cost on Mode Choice

As recommended in Section 3.2.3, the GA fixed time was also varied to show the model sensitivity to this variable. The effect of ± 30 minutes of fixed time is shown in Figure 122. A total of two hours of fixed time for the GA mode significantly reduces the utility of the mode.

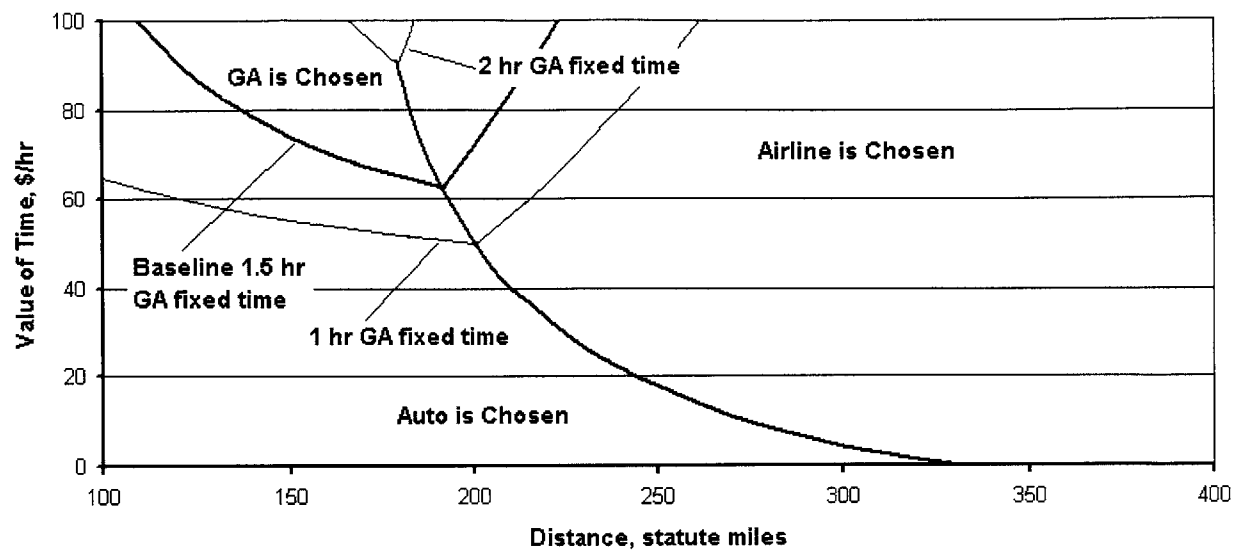


Figure 122: Effect of GA Fixed Time on Mode Choice

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4 BARRIERS TO THE UTILITY OF GENERAL AVIATION

In Chapter 2 a number of issues were identified as affecting the utility of general aviation (GA) as a transportation mode. In this chapter those barriers will be further discussed in two sections. First, the relative advantages and disadvantages of the three major transportation modes considered in Chapter 2 (the automobile, commercial airlines and general aviation) will be identified so that the strengths and weaknesses of GA travel in comparison to competing modes can be understood. Then, in Section 4.2, major factors affecting the value of travel by GA aircraft will be analyzed for importance, impact on mode choice, and possible mitigation strategies.

4.1 Relative Advantages of Three Major Transportation Modes

The issues discussed in this section follow from the transportation mode advantages identified in the survey in Chapter 2. The modes of transportation considered are the automobile, commercial airlines, and general aviation. These three modes were identified in the survey as being the major transportation modes most often considered in travel decisions (see Section 2.4.2, question 5).

4.1.1 Automobile

The U.S. Federal Highway Administration reports that in 1998 there were nearly 185 million valid drivers licenses in the United States (US FHWA, 2000). In the same year the Federal Aviation Administration reports that there were 618,298 active U.S. pilot certificates (GAMA, 2001). The U.S. Bureau of Economic Analysis indicates that in 1998 over 5.5 million cars were produced domestically (US BEA, 2000), while the General Aviation Manufacturers Association reports that 2,220 units were shipped by general aviation manufacturers based in the United States in the same year (GAMA, 1998). Clearly the automobile is a mode of transportation accessible to, and utilized by, far more people in the United States than general aviation.

The statistics would lead one to believe that the utility of the automobile is considerably higher than that of general aviation aircraft. Several major advantages that automobile travel holds over travel by GA aircraft were cited by those surveyed for this research (see Chapter 2, question 15). The most often cited advantage for the automobile over GA aircraft was the fact that weather was largely eliminated as a factor in traveling by automobile. Many survey participants noted that only the most extreme weather conditions (e.g. blizzard, ice storm) barred travel by automobile, whereas weather was reported as often being a factor in choosing against travel by GA aircraft (see Chapter 2, questions 8 and 13). Being able to travel in adverse weather is, then, a major advantage that automobile travel holds over general aviation.

The second most frequently cited advantage of the automobile is its lower cost for travel. As noted in the discussions of several questions in the survey, the expense of the travel mode was often associated with trip distance, rendering some modes more expensive than others depending on the distance traveled. Overall this was not the case when those surveyed responded to question 15 on the relative advantages of automobile travel in comparison to GA travel. While a few responses followed the pattern “for shorter trips the car is cheaper” most responses were a blanket statement “travel by car is cheaper” without a trip distance qualification. This may indicate an inherent bias in favor of the automobile when considering transportation costs.

Indeed, although responses to item awareness from question 18 would indicate that many of those surveyed consider fuel/oil, maintenance and insurance costs when thinking about automobile expenses, it is easy to often consider only the variable costs when traveling. If one considers the fixed costs (e.g. maintenance and insurance) already paid for because the vehicle is required for commuting to work, going to the store and other necessary events in everyday life, then only variable costs associated with adding fuel are considered to make longer trips in the vehicle. The American Automobile Association (AAA) estimates variable costs for an intermediate sized car at 10.80 cents per mile, whereas fixed costs are nearly four times higher, at 37.63 cents per mile (Section 3.2.1). It is thus quite easy to underestimate true costs for traveling with a vehicle that is also often viewed as a necessity for everyday life. This would tend to give the automobile an inherent advantage when compared to the expense of traveling by GA aircraft. In examining the survey responses to question 18, the mean estimate of the cost of driving an automobile was 25 cents per statute mile (Section 2.4.3), whereas AAA estimates the true costs of traveling by automobile at nearly double that amount. This tends to support the theory that fixed costs are often neglected for a transportation mode that is viewed as a necessity for everyday life. The true costs of traveling by automobile, as well as the impact of considering other variables such as the value of the traveler's time will be discussed in Section 4.2.2.

A third advantage cited for traveling by automobile is mobility at the destination. When making a trip by car, one would typically have ready access to that car at the destination. In question 8 of the survey one of the major factors for choosing against GA travel was the fact that the trip from the GA airport to the final destination could not be completed due to a lack of ground transportation. The automobile provides a true "doorstep-to-destination" travel mode without the concern of having to change modes to complete the trip.

A fourth major advantage of automobile travel is relatively easy access to the travel mode. One often has immediate access to a car at home and even at work. Before making a trip one may, at most, typically have to stop to buy fuel and then drive to the nearest highway on-ramp. Significant pre-trip planning is often not required beyond briefly studying a map to know which highways lead to the destination. As mentioned previously, prevailing weather becomes more of a curiosity than a deciding factor unless extreme weather conditions are imminent.

As mentioned previously (Section 2.3) barriers to entry were not studied in this research, but presumably one could also consider the relative ease of obtaining a drivers license and user friendly highway navigation as further advantages of traveling by automobile.

4.1.2 Commercial Airline

The U.S. Bureau of Transportation Statistics reports that in 1999 nearly 488 billion revenue passenger miles were flown domestically on scheduled and non-scheduled carriers (US BTS, 1999). It is clear that over the past 50 years commercial air travel has become a widely accepted mode of travel for both business and leisure purposes. It is yet unclear what affect the September 11, 2001 terrorist attacks will have on the airline industry.

In question 16 of the survey, GA pilots most often cited reduced travel time as a major advantage of travel by commercial airlines over general aviation aircraft. Most responses indicated that this advantage was held over longer distances where the higher cruise speeds of the airlines had a

chance to overtake the time disadvantage of traveling to the airport, checking baggage and waiting at the gate to board the aircraft. Most of those responding to question 16 indicated that they were considering the total doorstep-to-destination travel time.

The elimination of poor weather as a significant factor in traveling was the second most often cited advantage of the airlines over GA transportation. As noted under the discussion pertaining to the automobile, being able to travel in adverse weather is a major advantage held over GA travel.

The third most often mentioned advantage was the lower expense of airline travel when compared to GA, but only under certain conditions. At longer distances the airlines were noted as holding the advantage, as well as if the traveler could plan ahead and purchase less expensive tickets in advance. Those who took the survey also noted that in some markets airfares were low enough to make GA travel more expensive regardless of trip distance. The tradeoff between GA and the airlines in terms of total trip cost will be further discussed in Section 4.2.2.

Although barriers to entry have not been studied here, presumably the ability to purchase a ticket with relative ease in advance of the trip is also a major advantage of traveling by commercial airline. The lack of having to do significant route planning or any en route navigation would also be likely advantages for the average person considering travel by different modes.

4.1.3 General Aviation

By the various statistics noted in Sections 4.1.1 and 4.1.2, general aviation travel is the least utilized of the three major modes of transportation considered in this study. A number of major advantages that the other modes hold over GA travel have already been discussed. However, several significant advantages of traveling by GA aircraft were cited by those who participated in the survey.

The top advantage of traveling by GA aircraft identified by those who took the survey was that it was faster than the alternative modes of travel for a given trip. This advantage was typically contingent on the trip distance, with the automobile dominating at shorter distances and the airlines at longer distances. Most responses included a consideration of doorstep-to-destination trip time (including gate check-in and waiting for baggage for commercial airlines) and not simply en route travel time. The total travel time, in combination with the traveler's value of time, will be further discussed in Section 4.2.2.

The superior flexibility of traveling by GA aircraft was also cited as a major advantage of the travel mode. Those surveyed considered their ability to alter travel schedule as well as destinations as a significant advantage, particularly over commercial airline travel. Flexibility approaching that of GA travel could be had for airline travel, but only at a higher expense paid for in last minute ticket purchases, refundable tickets, and change fees for alterations in travel schedules and destinations.

The third most often named advantage of GA travel was greater convenience. This included access to a larger selection of destination airports, resulting in the ability to arrive closer to the final travel destination than with the commercial airlines. In addition, avoiding the hassle of long

lines at airline counters, various airline delays, and waiting in line for baggage at the destination were often mentioned in question 14 of the survey.

A fourth advantage frequently mentioned was the simple satisfaction and pleasure of traveling by GA aircraft. This included an appreciation of the landscape and sunsets while in flight, the challenge of piloting, a sense of being in control while flying, as well as the satisfaction and accomplishment associated with flying an aircraft.

4.2 Major Factors Affecting the Value of General Aviation Travel

In Section 4.1 it was seen that weather and expense were consistently mentioned as advantages the automobile and commercial airlines held over general aviation. In addition, mobility at the destination, reduced travel time, and ease of access were other advantages cited against GA travel. General aviation does have a number of factors contributing to its value, including travel time, flexibility, convenience and the pleasure of the travel. However, that value is reduced by factors such as weather, expense, lack of mobility at the destination, travel time and reduced access. Note that travel time acts to both create and reduce value for GA travel, depending on the trip distance.

In this section the two major factors acting as barriers to the utility of GA travel, weather and expense, will be studied for relative importance, impact on mode choice, and possible mitigation strategies. Three additional factors acting to reduce the value of GA transportation will be addressed: lack of mobility at the destination, total doorstep-to-destination travel time, and reduced access to the GA travel mode.

4.2.1 Weather: A Matter of Reliability

As one of the two major advantages that alternative travel modes hold over general aviation, weather will be discussed as it affects mode choice and the utility of GA travel. It will be observed that weather directly affects the reliability of the travel mode, and strategies for mitigating the impacts of the lower reliability of GA travel will be discussed.

In question 6 of the survey it was seen that weather is the most frequently cited factor considered in making travel mode choices (Section 2.4.2). One in four of those naming weather as a factor placed it within the context of influencing their ability to reliably reach their destination as scheduled. Nearly two-thirds of those responding to question 8 indicated weather as a major reason they would choose to not travel by general aviation. Unlike costs (as will be seen in Section 4.2.2), weather is not a factor that discriminates as to how an individual accesses their GA transportation. Both aircraft renters and owners alike mentioned weather equally frequently as a major consideration in mode choice. Thus, weather is an important discriminator in travel mode choice.

Weather also directly affects the utility of GA travel. The uncertainty of weather conditions during a travel period works to directly reduce the utility of GA travel through reductions in the reliability of the travel mode. This is apparent by examining several of the survey questions. As noted in the discussion of survey questions 1 and 2, if one travels frequently for personal/leisure purposes, that same individual is not necessarily likely to also travel frequently for business purposes. There is an interesting asymmetry in the travel data for trip purpose, which may be

explained, at least in part, by a requirement for higher reliability for business travel. In question 7 of the survey, for business trips nearly half of the respondents indicated that reliability of the travel mode became more important than it was for leisure and personal travel. The ability to get to their desired destination as scheduled was cited as the paramount consideration for many business travelers. This was reinforced by question 10 where reliability of the travel mode again rated as more important for business travel than for leisure travel. Since higher reliability is required for business travel, but not for leisure travel, it is reasonable to conclude that the reliability of GA travel is at least one of the factors that works to create the observed asymmetry between travel purpose and travel frequency. As discussed in Section 2.4.2, in looking at the survey population that frequently travels via GA aircraft for personal trips, only a minority of the population appears to find GA reliable enough for frequent business travel. There does appear to be a need for higher reliability (vis-à-vis weather) in the GA transportation mode before it can be more fully utilized for business travel. Thus, reliability directly affects how frequently GA travel is used, based on travel purpose, and weather directly influences GA reliability. Poor weather, or the uncertainty of what weather conditions will prevail, therefore directly reduces the utility of GA aircraft.

Overall, GA travel was not viewed by those who took the survey as a reliable travel mode relative to other available modes. In question 14 just over 2% of those who responded felt GA travel was more reliable in comparison to airline or automobile travel. Most often noted were unanticipated delays when traveling by commercial airline. Likewise, one of the major advantages that the other travel modes have over GA travel is the ability to travel through poor weather. In question 15, 39.3% of the responses indicated that weather was largely eliminated as a factor in traveling by automobile, noting that only the most extreme weather conditions barred travel by automobile. Likewise in question 16, 41.2% of those responding indicated that weather was largely eliminated as a factor in traveling by scheduled airline, with the exception of severe weather such as icing. Therefore, alternative travel modes have reduced risks associated with weather, and thus hold an important advantage over GA travel.

Responses to the survey also indicated a desire to reduce the risks associated with weather, typically through improved technology. Of those who indicated in question 19 that better weather information was desired, 76.2% specified that having real-time information available in the cockpit during flight was important. This would likely require some of the more sophisticated datalink and graphical display technology available on the market. Several of those surveyed also cited near all-weather capability as important to improving the utility of general aviation transportation. This included improved access (typically through reduced costs and certification requirements) to all-weather equipment such as anti-ice, plus the allowance of precision approaches using GPS and zero-zero minimums.

Mitigating the reliability risks associated with weather may actually reduce the overall value of GA transportation. Even with sophisticated in-cockpit weather information, certain types of weather still cannot be safely traversed in the typical single engine piston aircraft considered by over 86% of those taking the survey (Section 2.4.1.2). This leaves a principal mitigation strategy of seeking alternative modes of travel in case of degraded weather. This mitigation strategy, however, can couple the twin disadvantages of reliability and expense, further reducing the value of GA travel.

Consider, for example, that GA is the preferred travel mode for some given trip several weeks in the future. In the mode choice model (Chapter 3) the individual's value of time favors GA travel at the given trip distance. However, the ability to complete the trip on a certain schedule (date and time of day) is required, but the weather on the day of the trip is currently uncertain, thus making the trip by GA aircraft a risky proposition. The individual mitigates this risk by planning to take a commercial airline flight if the weather is bad enough the week of the trip to prevent reliable GA travel. The question then becomes "*At what point does the individual purchase an airline ticket, and what type of ticket is purchased?*" Mitigating the risk due to reliability is now coupled with expense, acting to increase the expense of planning to travel by GA aircraft, and possibly reducing the overall advantage of GA travel. The threshold at which the mitigation strategy offsets the advantages of GA travel is unknown and cannot be determined with the data at hand. It likely varies for the individual traveling and for the purpose of the travel. However, the offsets may be examined here to see how they affect the overall value of GA travel.

There is a temporal variation in airline ticket prices. For several of the top 1000 airline travel origin and destination pairs researched in Section 3.2.2, the variation of ticket price with days of advance purchase was studied. The change in ticket price, as determined from the airline web sites, is shown in Figure 123. This chart shows, for example, that for the handful of city pairs examined, tickets purchased five days in advance can be as much as five times more expensive than tickets purchased 30 days in advance.

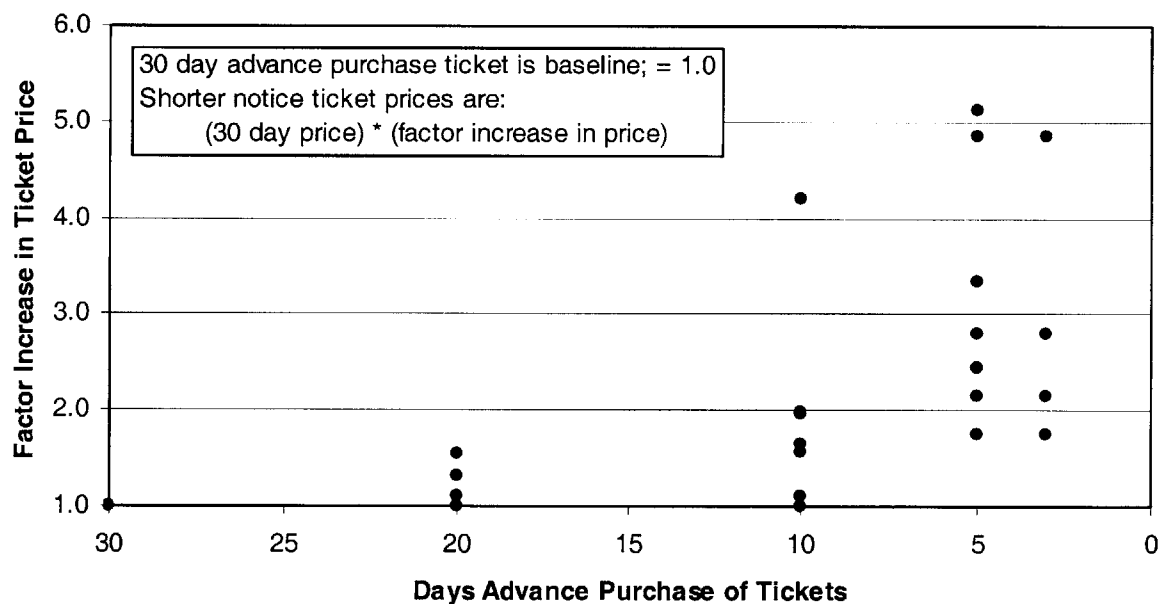


Figure 123: Temporal Variation in Airline Ticket Purchase Prices

The ability to plan travel in advance, then, is key to the commercial airlines' cost advantage over GA travel. The cost of GA travel is relatively invariant with the amount of advance planning, although access to GA travel may be affected (e.g. a rental plane may need to be reserved days or

weeks in advance). For trips requiring a relatively high reliability then, should backup airline tickets always be purchased 30 days in advance as a mitigation strategy? Holding the spare airline ticket would clearly result in an adverse shift in the utility of GA travel, as shown in Figure 124. In this figure the GA costs have been increased by adding the purchase price of one airline ticket using the most optimistic (least expensive) fare curve (see Section 3.2.2). The area over which GA is the preferred mode has been significantly reduced by using this mitigation strategy. See Section 3.2.4 for a detailed explanation of the baseline mode choice model without the additional airline ticket expense considered here.

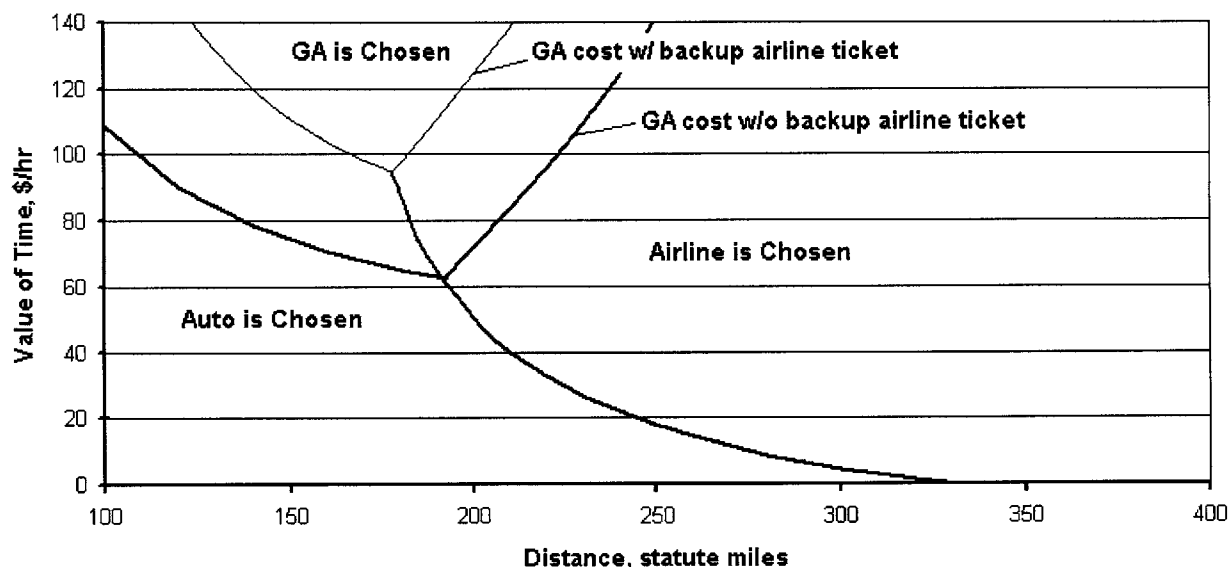


Figure 124: Change in GA Utility with Purchase of Backup Airline Ticket

Perhaps the decision to purchase tickets should instead be delayed until 10 days in advance of the GA trip when the weather might be more certain. Is the risk of purchasing more expensive tickets 10 days in advance outweighed by the possibility of not having to purchase any airline tickets and being able to travel by GA aircraft? The threshold for delaying this decision likely varies with the individual and is based on their risk tolerance. A similar argument may be made regarding the decision to purchase more expensive, refundable airline tickets in the hopes that weather permits GA travel and that the ticket price may subsequently be refunded.

In summary, weather is an important discriminator in travel mode choice and weather directly reduces the reliability, and thus the utility, of GA aircraft. Additionally, alternative travel modes have reduced risks associated with weather, and therefore hold an important advantage over GA travel. The reliability of GA travel vis-à-vis weather and the cost of planning GA travel are coupled issues. If risks due to low reliability are to be mitigated, the risk of higher costs grows.

4.2.2 Expense

As the second of the two major advantages that alternative travel modes hold over general aviation, expense will be discussed in this section as it affects mode choice and the utility of GA

travel. It will be shown that responses in the utility survey focused on expense as a top decision factor in travel mode choice. However, several factors suggest that GA is not as disadvantaged relative to other modes as expense alone would indicate. Also evident will be the fact that costs do not affect all GA users equally, and that cost impacts are also dependent on the purpose of the travel. Finally, if a reduction in costs is desired, changing the basic business model to better share fixed costs is likely to be the most effective near-term solution.

In the utility survey, responses largely focused the cost disadvantages of traveling by general aviation. In the responses to question 6, expense of the travel mode was ranked as a top consideration when choosing among travel modes. Some of those responding to the question indicated that GA was left at a disadvantage if an employer was willing to reimburse business travel expenses only for airline travel, or for expenses only up to the cost of an airline ticket. In question 8 over one-third of those responding mentioned the expense of traveling by GA as a major reason for choosing an alternative travel mode. Furthermore, in question 13 the fact that an alternative travel mode was less expensive ranked second as the most highly rated factor in deciding to not travel by GA aircraft. The pilots surveyed also focused on the desire to reduce expenses, rating a reduction as the most frequently cited factor for improving the utility of GA aircraft in question 19.

Alternative travel modes were also perceived as holding a lower-cost advantage over general aviation, at least at certain trip distances. In question 16, a major advantage of airline travel was cited as lower costs at longer distances. Likewise, in question 15 the automobile was considered the lower cost alternative, frequently without a conditional trip distance mentioned. Specifically comparing automobile and GA travel expenses, questions 17 and 18 indicated a \$40 per 100 statute mile cost advantage for the car.

However, there is evidence that the costs to drive and fly 100 statute miles estimated in the survey are generally understated for both modes. Estimates from the American Automobile Association, as discussed in Section 3.2.1, place fixed and variable costs to drive a car at approximately \$48 per 100 statute miles, compared to survey estimated costs of \$25. Federal Aviation Administration estimates for a single engine piston aircraft capable of a 160 kt cruise speed are approximately \$128 per 100 statute miles (see Section 3.2.3). Survey estimated costs for flying 100 statute miles were \$65. In both cases, the true travel expenses were underestimated by nearly one-half. These estimated costs and their impact on the mode choice model are shown in Figure 125. This figure suggests that those who were surveyed tended to perceive the utility of a single engine piston aircraft to be significantly higher than true costs might indicate. The minimum value of time at which GA became the preferred mode drops from over \$60/hour to under \$40/hour when the survey estimates are considered. In addition, the trip distances over which GA is preferred extend from under 200 miles at \$60/hour VOT to approximately 375 miles at under \$40/hour VOT. The fact that GA utility is perceived to be higher than it actually is suggests that costs may not be placing GA at the overwhelming disadvantage that was first thought. See Section 3.2.4 for details on the baseline mode choice model used in comparison here.

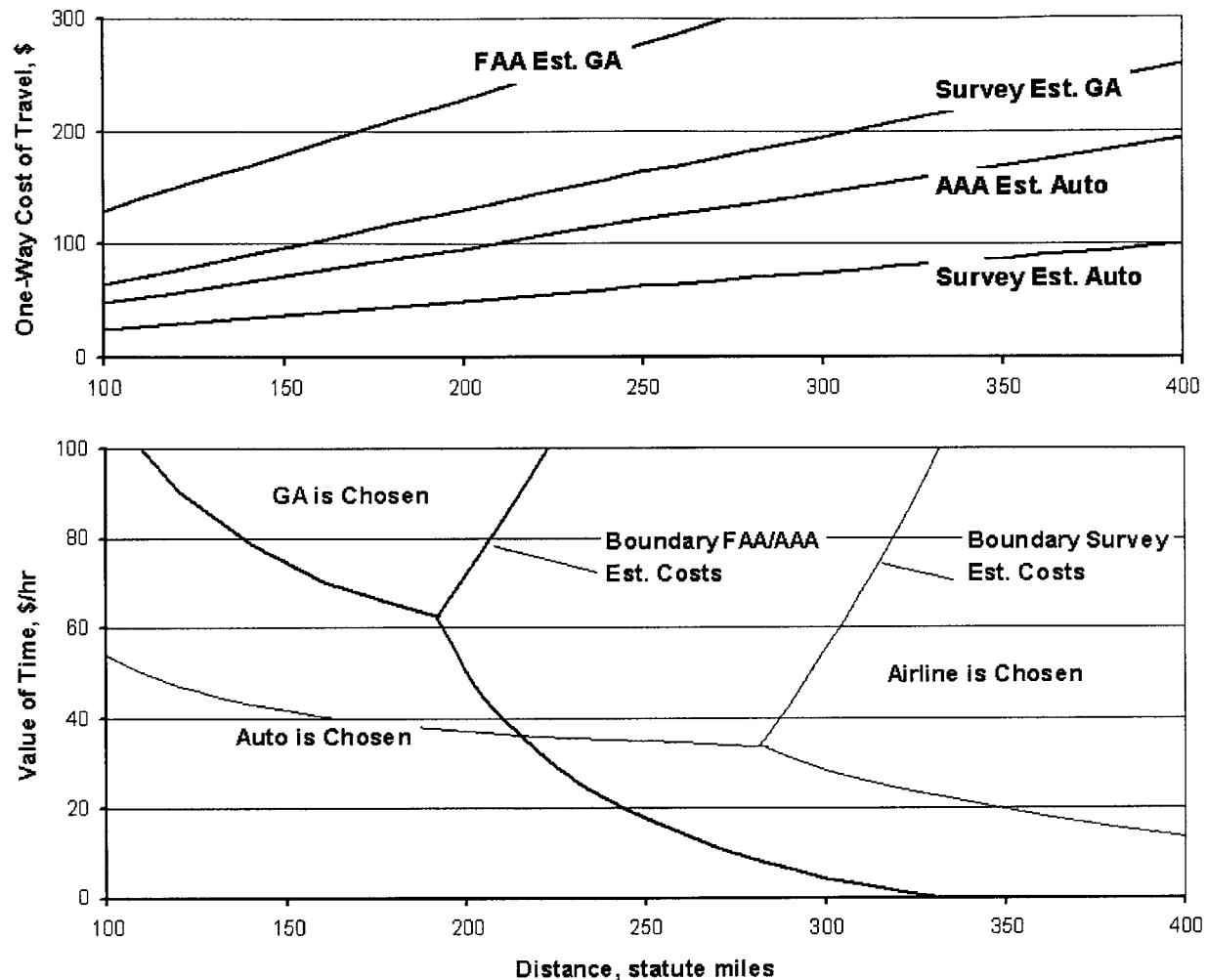


Figure 125: Comparison of Mode Choices Using Survey Estimated Costs and Costs From AAA and FAA Estimates

To further consider the disadvantage that GA may have with respect to other modes of travel, the true characteristics of all modes should be considered. Up to this point only the most optimistic (fastest) airline travel times have been considered (Section 3.2.2). For travel involving layovers or routing through hubs this is not realistic. Figure 126 shows a modified curve fit used for airline gate-to-gate travel times. In addition, the airline tickets prices used in the mode choice model were also modified, as shown in Figure 127, perhaps reflecting prices to less frequently traveled destinations or for tickets not purchased 30 days in advance.

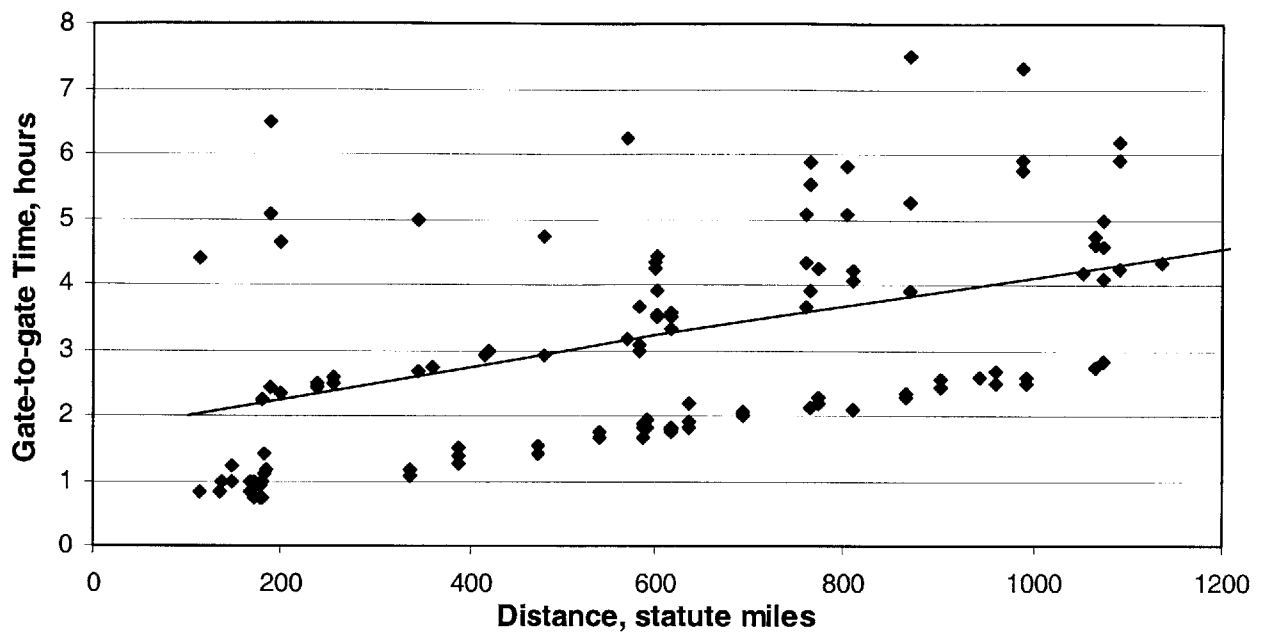


Figure 126: Longer Gate-to-gate Travel Times for Airline Travel

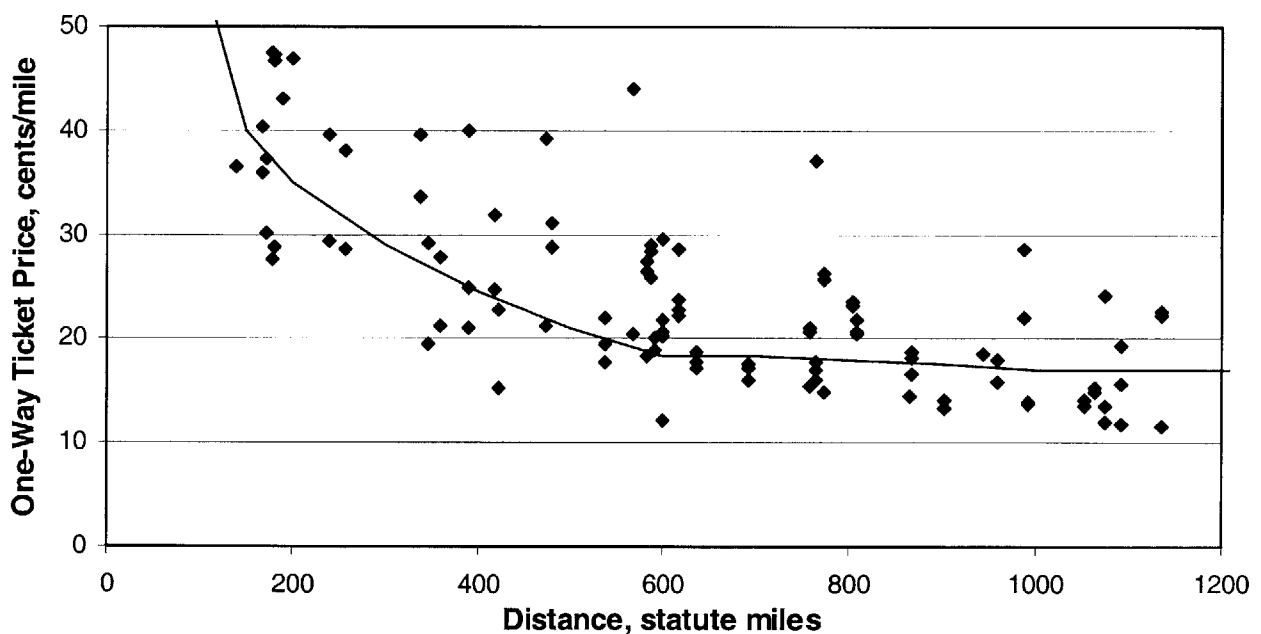


Figure 127: More Expensive Ticket Prices for Airline Travel

In addition to the airline changes, one stop was also added to the automobile trip after five hours of travel, reflecting a one-hour stop for a meal and for refueling the car. A \$10 meal price was added to the auto trip cost at this point as well (refueling costs are already accounted for in the variable automobile costs).

The new one-way costs and travel times for the automobile and airline are shown in Figure 128. Note that GA costs and travel time have not changed from the baseline model developed in Section 3.2.4. Although the GA travel mode remains more expensive when considering costs alone, GA has gained an important time advantage over the airline at shorter distances and particularly over the automobile after the single stop is made.

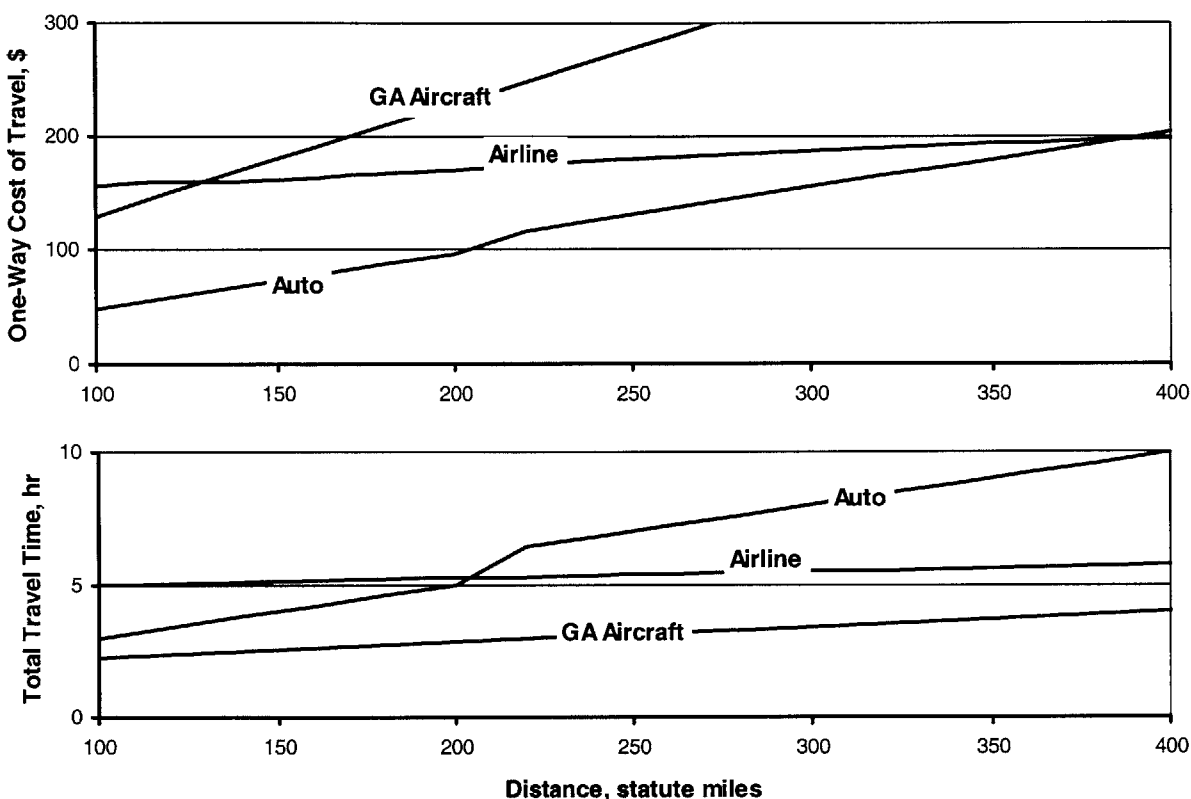


Figure 128: Travel Costs and Time with Increased Airline and Automobile Expenses and Travel Time

Combining these factors into the mode choice model (Figure 129) shows that the area over which GA now becomes the preferred mode has increased considerably in trip distance, compared to the airline. For clarity the baseline model has been omitted from Figure 129. The airline is also a less attractive choice than the automobile for slightly longer distances. Travel by GA now dips down into lower value of time ranges, previously dominated by the automobile, because of the time it takes to make the single stop in the car. This simple analysis suggests that, although GA transportation remains more expensive than alternative modes, GA is not as disadvantaged as expenses alone would indicate. The time savings from GA travel adds significant value to the transportation mode. This will be discussed in further detail in Section 4.2.4.

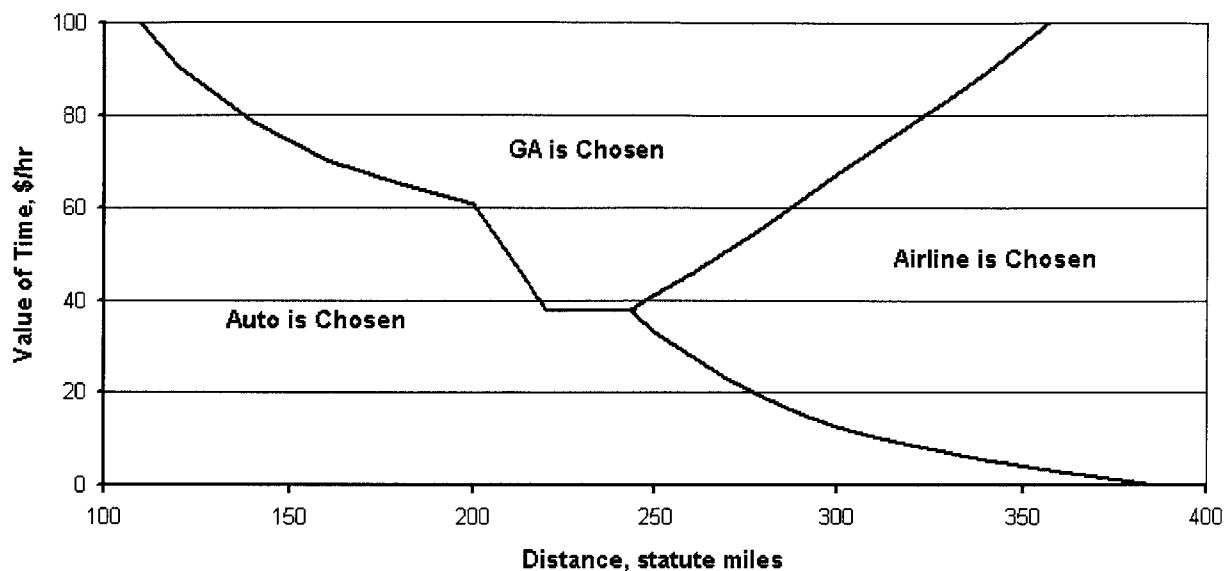


Figure 129: Mode Choice for Increased Airline and Automobile Expenses and Travel Time

As mentioned previously, survey responses focused on cost as a significant factor in mode choice (question 6), and in choosing against GA as a travel mode (questions 8 and 13). However, it is of interest to see how owners and renters view expense, and how the issue changes for travel purpose. In question 6, cost dropped from the number one issue to fourth place among aircraft owners, superseded by weather, travel time and convenience as the most frequently mentioned considerations. Conversely, cost of the travel mode was mentioned more frequently among those who typically rent their aircraft, growing from 48% for the overall survey population to 69.9% for those who rent. Responses to question 8 indicated that 20% of aircraft owners chose to not travel by GA aircraft due to costs, but 59.3% of renters chose against GA because of costs. In survey question 10, expense ranked as generally more important for those who typically rent their aircraft, regardless of trip purpose, than for those who own their aircraft. In question 13, cost was indicated by 91.9% of aircraft renters as a factor of some degree, with 44.3% rating it as a “frequent factor,” in deciding to not travel by GA aircraft. In comparison, only 10.9% of aircraft owners cited cost as a “frequent factor” in question 13, with 35.6% indicating that it was “no factor” in their decisions.

As to trip purpose, responses to question 7 indicate that costs become more important for leisure or personal travel than for business trips. Data from survey question 10 also confirms that costs are a somewhat more important factor when the purpose of the trip is for leisure or personal reasons. One might reasonably conjecture that personal trips are paid for out-of-pocket by the traveler, whereas business travel expenses are reimbursed by an employer. Clearly the expense of the travel mode has been shown to be a more important issue for those who typically rent their aircraft and for those who travel for personal or leisure purposes. Aircraft owners have not indicated that their decisions to choose against GA aircraft for travel are frequently influenced by expense. Thus, cost reductions will not uniformly increase the value of GA travel to all users, perhaps reducing the value of pursuing cost reductions overall.

If costs were to be targeted for reductions, it would be of interest to know which cost reductions would be most effective. Responses to survey questions indicate that cost is an ill-defined concept for most, however. Item awareness for major costs studied in survey questions 17 and 18 suggest that most pilots consider the same top three factors in their costs for both automobile and GA travel: fuel/oil, maintenance and insurance. For those mentioning a desire for cost reductions in question 19, the nature of which costs were acting as barriers to GA utility varied, with no clear majority in any category. This would suggest that perhaps pilots consider all costs associated with GA travel high.

Instead of focusing on one source of GA travel expense for mitigation of the cost disadvantage, perhaps a more sound near-term strategy would be to focus on the business model of acquiring GA aircraft for overall reductions in costs. In survey question 3, those who responded were largely split between those who wholly own an aircraft and those who typically rent their aircraft. Just over one-eighth of those who took part in the survey share an aircraft through a partnership with one or more people or through a formal fractional ownership program. Thus the great majority of survey participants either wholly own or rent their aircraft.

As seen in the GA aircraft cost derivations in Appendix C, the fixed costs of aircraft ownership are significantly higher than the variable costs (anywhere from 40% to 100% higher in the three cases examined). Reducing the fixed costs through sharing of the costs (joint ownership) and/or increased utilization (annual hours) would seem to be best place to look for effective reductions in overall expenses. The cost differential between sole ownership of a GA aircraft and a two-person partnership (fixed costs evenly split) is shown in Figure 130. All GA costs are those used in the baseline model of Section 3.2.4. The mode choice model in the same figure shows a significant increase in the distance and value of time over which GA then becomes the transportation mode of choice.

Flying clubs effectively act as partnerships to spread fixed costs among several owners and to increase annual utilization, effectively reducing the fixed costs per hour. Fractional ownership programs have become popular with larger, more expensive aircraft for this same reason. There are still several issues with smaller aircraft, like the single engine pistons that most survey participants considered, that prevent them from being a good option for fractional programs. Keeping maintenance costs at predicable levels through so-called power-by-the-hour arrangements with engine suppliers is one essential ingredient that fractional programs have not yet been able to negotiate for smaller aircraft.

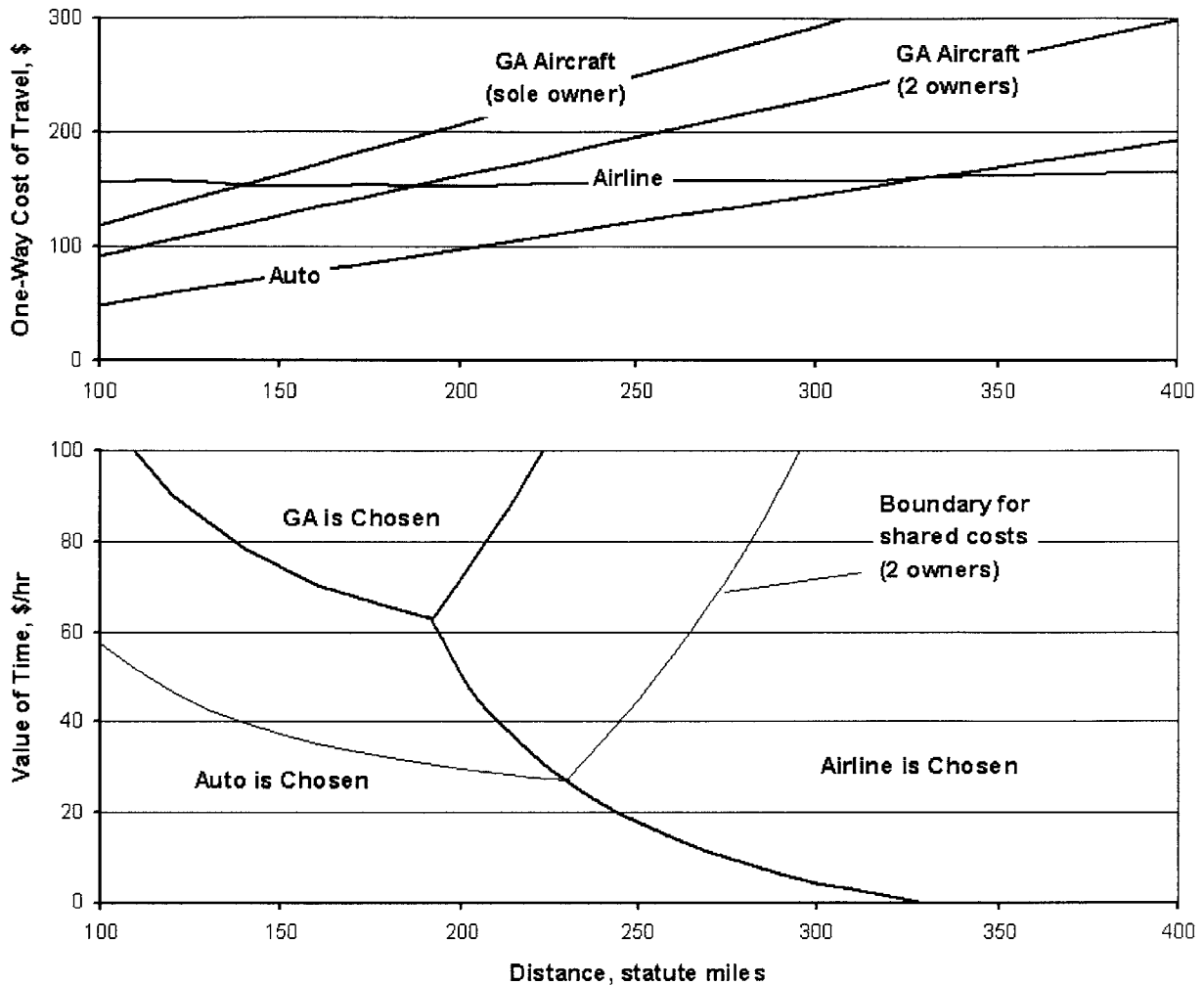


Figure 130: Comparison of Sole Ownership of a GA Aircraft and Two-person Partnership

While aircraft rental does spread fixed costs among several users to some extent, profit requirements increase rental fees and, as some survey responses indicate, overnight charges are often prohibitive, thus reducing the value of the aircraft for longer duration trips.

In summary, responses to the utility survey largely focused on the cost disadvantages of traveling by general aviation. Alternative travel modes were also perceived as holding a lower-cost advantage over general aviation, at least at certain trip distances. However, GA utility was generally perceived to be higher than actual costs would indicate, suggesting that costs may not be placing GA at the overwhelming disadvantage that was first thought. A mode choice simple analysis also suggests that, although GA transportation is typically more expensive than alternative modes, GA is not as disadvantaged as expenses alone would indicate. In addition, cost reductions would not uniformly increase the value of GA travel to all users, perhaps reducing the value of pursuing cost reductions overall. If a reduction in costs is desired, changing the business model to share fixed costs is likely the most effective near-term solution.

4.2.3 Mobility At The Destination

Weather and travel expense were, without doubt, the two outstanding barriers to increasing the utility of general aviation raised in the pilot survey conducted for this research. All other issues received mixed results, being raised on some questions and not others, considered of importance to some GA users and not others. There are, however, at least three additional issues that were consistently cited throughout the survey that merit attention. The first of these three issues is the mobility of the traveler at the trip destination.

The ability to access ground transportation to complete a trip is an important factor in choosing the travel mode. In survey question 6, nearly one-in-four of those who took the survey identified the availability of transportation at their destination as an important consideration in choosing their mode of transportation. This included access to public transportation, taxis, or rental cars. Also under consideration was the cost of the transportation (often mentioned as being higher at GA airports than equivalent transportation at commercial airports) as well as access after business hours and on weekends. The “courtesy car” so frequently available at GA airports for temporary use were cited by some as unsatisfactory for trips that required access to transportation overnight or for several days. Reinforcing the importance of ground transportation, in question 10, mobility at the destination was rated as an important factor in choosing travel mode in over 90% of the responses, regardless of travel purpose. In addition, the issue was rated as “very important” by over half of those indicating that it was an important issue.

Mobility at the travel destination becomes an even more important issue when survey responses indicate that a lack of mobility is resulting in decisions to travel by modes other than general aviation. In survey question 8, poor transportation from GA airports to the final travel destination was mentioned as an important factor in choosing against GA travel by 15.2% of those responding to the question. Responses indicated that the automobile was favored for shorter trips, and that the commercial airlines were superior for longer trips because access to ground transportation was typically better (i.e. more accessible and less expensive) at commercial airports. In question 13, the issue of mobility ranked as the fourth most highly rated factor in decisions to not travel by GA aircraft. Only weather, cost, and a tie between the travel time and access to transportation ranked above mobility at the destination as factors (note that these other issues are discussed in this chapter as well).

Finally, in question 15 the most frequently cited advantage of traveling by automobile over GA aircraft was the fact that travelers would have ready access to a car at their destination. In survey question 19, of those who responded that improving GA airport facilities was important to reducing the barriers to GA travel, 64.5% specifically cited access to ground transportation as being the important factor.

Mobility at the destination is likely not an obvious issue to policy makers seeking to improve the utility of general aviation transportation. As discussed in Section 4.1.3, GA’s greatest value is in its reduced total travel time, superior flexibility, greater convenience, and simple satisfaction and pleasure of the travel. However, it is important to note that the inability to complete the last few miles of any given trip can overcome any superior value of using GA as a transportation mode.

For this reason, mobility at the travel destination is equally important as other barriers such as adverse weather and expense of the travel mode.

4.2.4 Doorstep-to-Destination Travel Time

A second additional issue consistently cited throughout the survey that merits further attention is the total doorstep-to-destination travel time. A unique characteristic of this issue is that it can both work for and against GA travel due to the fact that travel time varies with travel distance as well as with the speed of the transportation mode.

The total travel time is important to choosing the transportation mode. In survey question 6, the travel time was superseded only by weather and travel expense as a consideration in choosing among the various modes of transportation. In this and other questions it was apparent that many of those surveyed were considering the total doorstep-to-destination travel time, which may include factors such as driving to the airport, waiting in lines to check-in, and pre-flight activities for GA. In question 10, survey participants rated doorstep-to-destination travel time highly as an important issue, but also made the distinction that it was of more importance for business travel than for leisure or personal travel. This same pattern was observed in question 7 when it was asked how the importance of factors changed when the purpose of the trip changed. In both questions 8 and 13 the total travel time was also identified as a factor, albeit not a frequent one, in choosing against GA travel on any given trip.

The major advantage of general aviation travel identified in question 14 was that it was faster, overall, than the automobile and commercial airlines, but only for a limited range of trip distances. This raises the duality of total travel time as both an advantage and disadvantage of GA travel. Survey respondents generally indicated that they were cognizant of this duality when answering all survey questions pertinent to travel time. From question 14, in particular, it is evident that for shorter travel distances the additional time involved with preflight planning and preparation for travel by general aviation caused some to favor travel by automobile. At longer distances some of those surveyed noted that the airlines were able to fly faster than the GA aircraft available to them, so the total travel time was reduced in favor of the commercial airlines.

The exact limits of where GA is the preferred mode of travel will be highly dependent on the cruise speed of the aircraft as well as assumptions on required preparation times. Under the assumptions associated with creating Figure 128 in Section 4.2.2 (reproduced here as Figure 131) a 160 kt single engine aircraft clearly has a travel time advantage over the entire range of trip distances studied. When combined with cost factors in the mode choice model, Figure 132 indicates that GA is the mode of choice for a more limited range of trip distances, depending on the traveler's value of time.

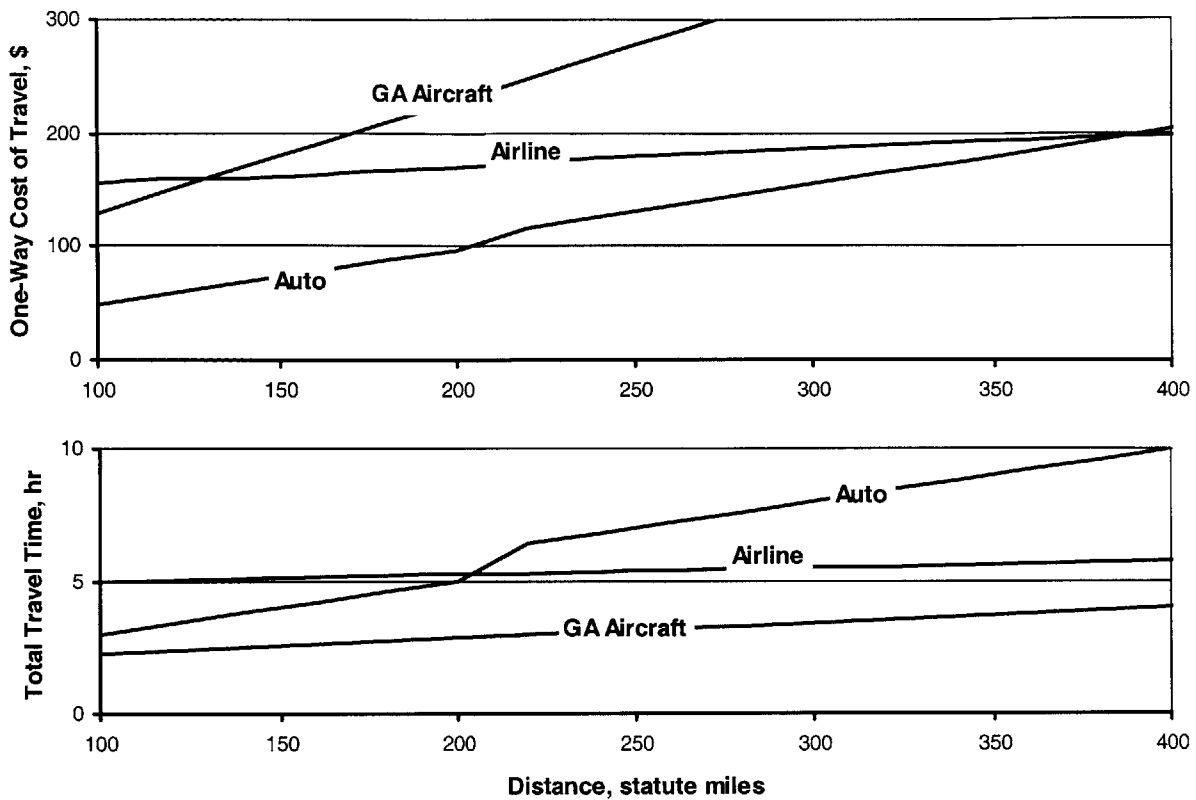


Figure 131: Travel Costs and Time with Increased Airline and Automobile Expenses and Travel Time

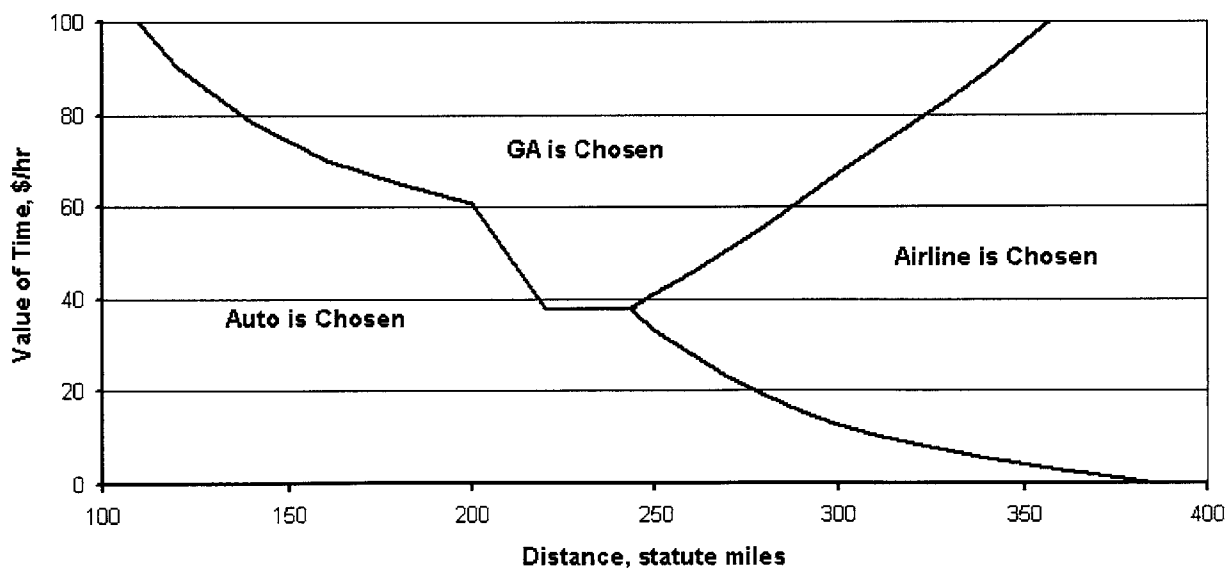


Figure 132: Mode Choice for Increased Airline and Automobile Expenses and Travel Time

The value of increasing the cruise speed of GA aircraft to reduce the total travel time can easily be seen in the mode choice model as well. Reverting to the baseline costs and travel times for the airlines and automobile (see Section 3.2.4), the cruise speed of the single engine piston GA aircraft was varied from 140 kts to 200 kts (block times for the new aircraft speeds are shown in Figure 133). The resulting changes in the mode choice model are shown in Figure 134. The area over which the GA aircraft becomes the mode of choice increases significantly with the higher cruise speeds under these assumptions. It would appear to be quite easy to increase the utility of GA transportation simply by making faster aircraft available and thus reducing the total travel time. In fact, one recommendation under survey question 19 was to upgrade GA technology with a new generation of small jet engines now becoming available from some engine manufacturers.

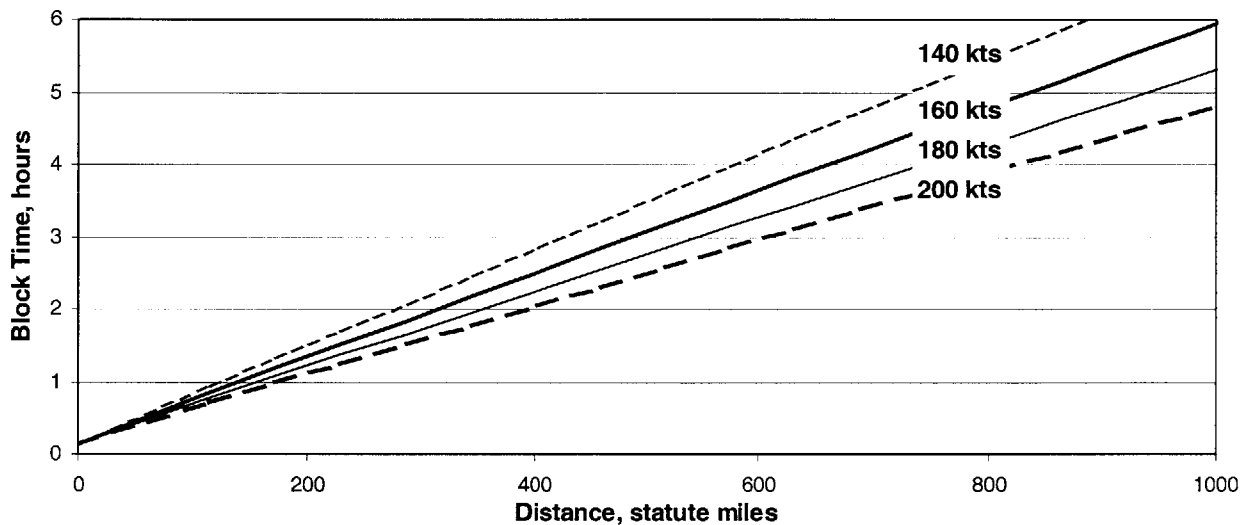


Figure 133: Block Time for Various Aircraft Cruise Speeds

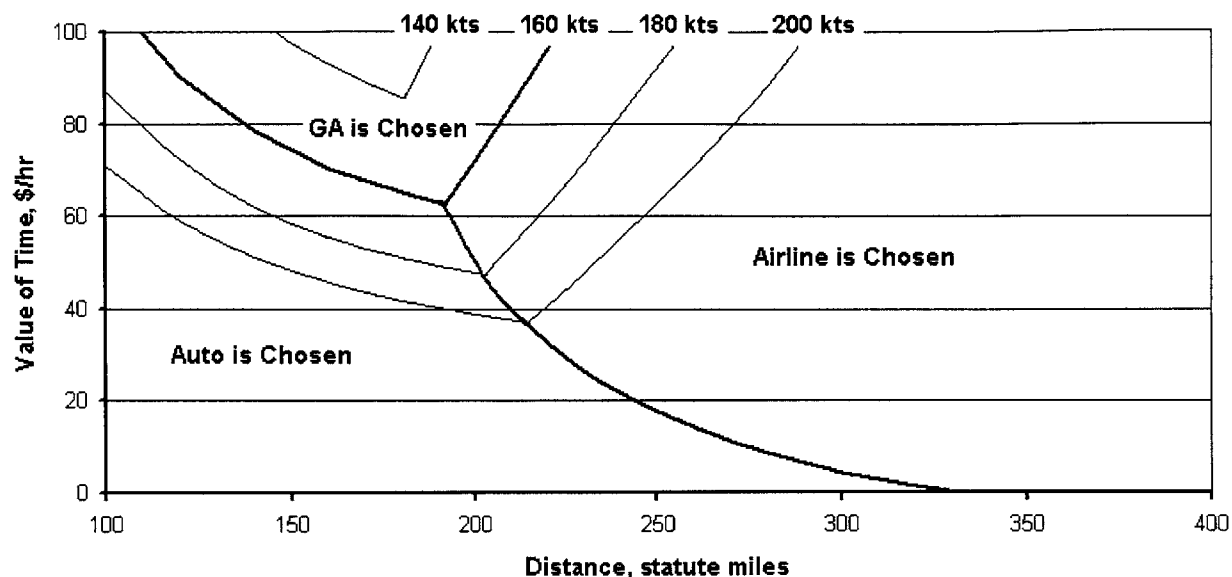


Figure 134: Increasing GA Utility as GA Cruise Speed Increases

The assumptions underlying the preceding analysis are too simplistic, however, and lead to the false conclusion that higher speeds easily increase utility. One must also consider that increased speed must necessarily come at a price. The change in GA aircraft purchase price with increasing cruise speed is shown in Figure 135. Prices and speeds shown in Figure 135 are those for actual aircraft quoted in *Business & Commercial Aviation* (2000). In Appendix C representative fixed and variable costs were calculated for three different types of GA aircraft. The baseline aircraft used up to this point in the research has been the 160 kt, single engine piston aircraft (based on a Cirrus SR20, as noted in Appendix C). Now a 200 kt cruise speed should be balanced with the increased costs of a twin turboprop aircraft such as a Piper Seneca V. Likewise, another single engine aircraft with a 190 kt cruise speed was also treated in Appendix C (a Lancair Columbia 300). The new costs and speeds associated with these aircraft were used in the mode choice model to see how their utility compared to the slower baseline aircraft. As evident in Figure 136, considering only sole ownership scenarios for these aircraft, the overall utility has been reduced for both aircraft once the higher costs of ownership offset the higher cruise speeds. Only the single engine, 190 kt aircraft is preferable at longer distances where the higher cruise speed has a chance to overcome the higher costs. One should note that these are only representative examples and that under varying assumptions the aircraft utility may increase. But the underlying assumption that faster aircraft naturally have greater utility should at least be placed in some doubt by this simple example.

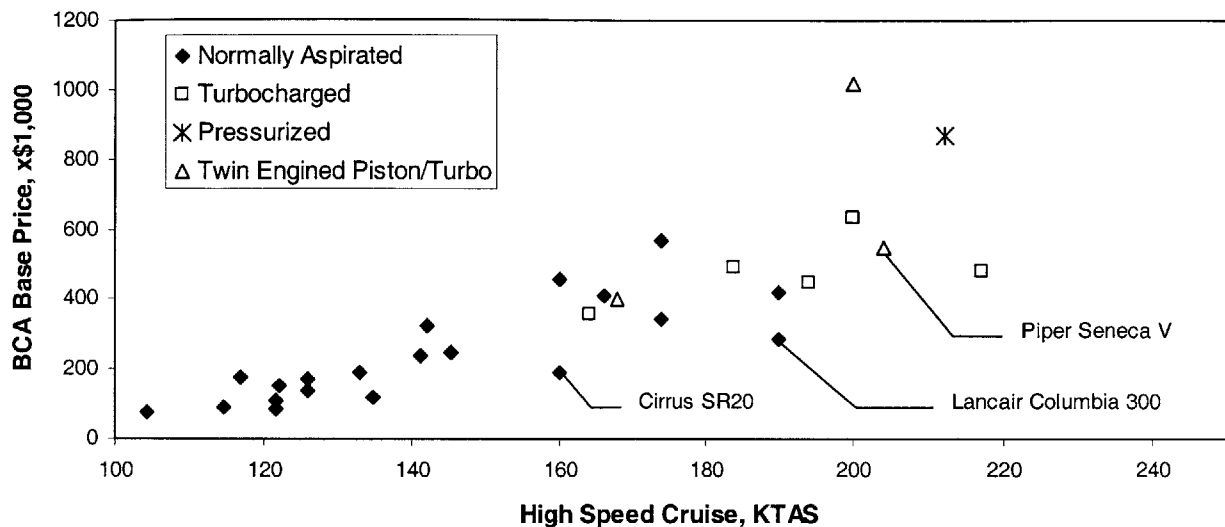


Figure 135: Variation of Aircraft Purchase Price with Speed

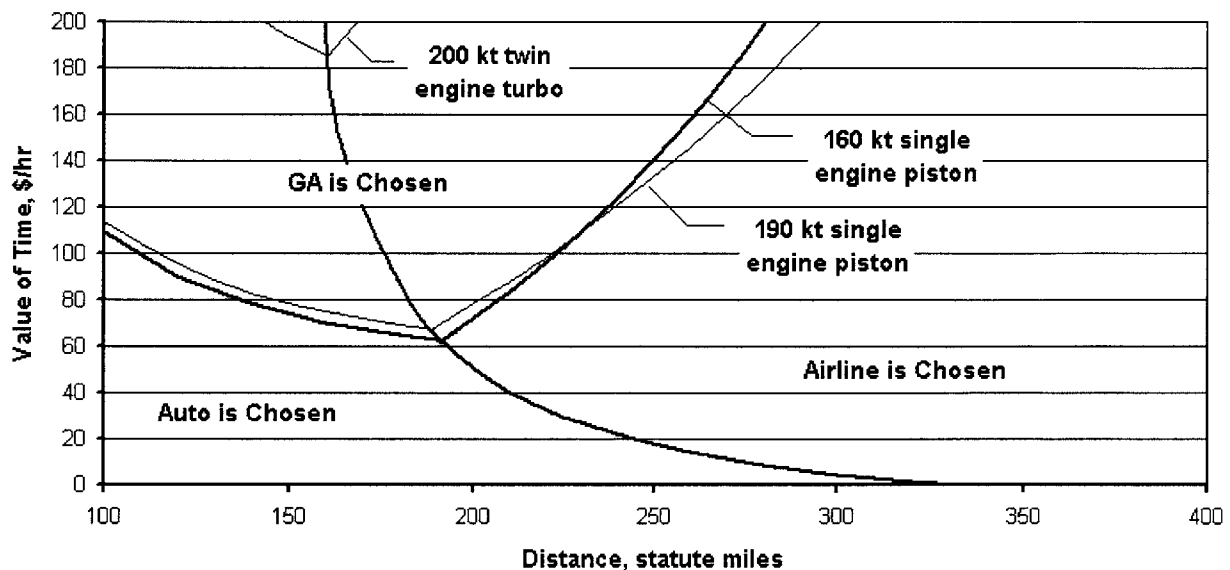


Figure 136: Change in GA Utility When Higher Speeds Are Offset by Higher Costs

In summary, reduced travel time is a valuable asset for GA transportation, especially if the true travel time and costs are considered for alternative transportation modes. However, the area over which GA holds this advantage is quite limited, which in turn acts as an important barrier to the use of GA transportation. The commercial airlines will clearly remain dominant at some longer distances, while the automobile will likewise dominate the mode choices at shorter distances. These threshold distances will depend on the speed and costs of the various travel modes as well as traveler characteristics such as the individual's value of time. One should also be wary of assuming that higher GA cruise speeds automatically translate into higher GA utility.

4.2.5 Reduced Access: A Matter of Convenience

A third additional issue that merits attention is access to the travel mode, also considered by many of those surveyed as a matter of the convenience of the travel mode. The ability to access more GA airports closer to the actual travel destination was cited as one of the major advantages of GA transportation (Section 4.1.3). Although there is little indication that a lack of access is currently impeding travel by GA aircraft, significant concern was expressed by those surveyed that this advantage was swiftly eroding.

In survey question 6, the convenience of the travel mode was rated highly as a factor in making travel mode decisions. When citing convenience as a consideration most of those surveyed associated it with ease of accessing the travel mode, either at their travel origin or destination. This included factors such as whether a commercial airport was located nearby or if a general aviation airport was located near their destination. In both questions 8 and 13 the convenience of the travel mode was cited by the overall survey population as an occasional factor in choosing to not travel by GA aircraft. Access to GA aircraft is a far greater concern among those who typically rent their aircraft, with scheduling issues being mentioned as a deciding factor against GA travel by over 82% of those renters responding to question 13. Conversely, nearly 90% of aircraft owners rated scheduling issues as “no factor.” This suggests that, although aircraft accessibility problems are currently a major factor for those who rent aircraft, the overall convenience of GA travel (e.g. access to more airports) remains at an acceptable level such that it does not yet frequently play a deciding factor in choosing against GA transportation.

Although the survey data indicates that the utility of GA transportation is not, on the whole, reduced by access issues, significant concern was expressed by those surveyed that access was quickly eroding. In survey question 19, slightly less than 20% of those responding indicated the need for more GA airports and runways to reduce barriers to general aviation. This issue rated third, only behind reducing costs and updating technology, both of which have been discussed elsewhere. A great number of those responding to question 19 also expressed concern that a significant number of general aviation airports were being closed, thus eroding one of GA’s greater advantages in the convenience of the mode. In question 8, several responses also pointed to employer travel reimbursement policies that were biased against GA travel as, in effect, restricting their access for business travel. Some concern was expressed in question 19 that employers needed to be better educated as to the true benefits of GA travel, thereby reducing some implicit barriers to business travel.

In summary, the greater convenience of GA travel, expressed as access to both aircraft and GA airports, is an important decision factor in making travel mode choices. Currently, those who typically rent aircraft rate access as a major factor in their choices to not travel by GA aircraft. For the overall survey population, convenience has not yet degraded to the point that it is significantly impacting mode choices. There is a good deal of concern in the pilot community surveyed for this research, however, that access (and convenience) is eroding with GA airport closures and employer travel restrictions. The issue of convenience is currently one of GA’s major advantages, but many feel it is in danger of becoming a barrier to GA utility.

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5 CONCLUSIONS

For the survey conducted in this research, the Internet proved to be an invaluable tool for disseminating notices of the web-based survey and for collecting the survey data. In just under two months over 1,500 surveys were submitted for this research, 1,471 of which were suitable for use. Since the data was submitted electronically, true anonymity could be maintained (no return addresses on envelopes or handwriting to be recognized, etc.) and quantitative data (e.g. yes/no answers, numerical answers such as flight hours) could be quickly analyzed using computer tools such as Microsoft Excel and Visual Basic.

Survey responses represent the opinions of pilots active in the North American general aviation system. According to the survey data, at least 96.7% of all survey respondents typically fly their GA aircraft in North America. In addition, most of the survey participants were moderately experienced pilots, with approximately three-quarters reporting 2,000 hours of flight experience or less. Nearly one-third of the pilots reported between 100 and 500 hours of flight experience.

The term “general aviation” was not defined in the survey, however over 86% of those surveyed identified a single-engine piston aircraft as their general aviation aircraft when answering the survey questions. Certainly the small Cessna and Piper type aircraft is considered the epitome of “general aviation aircraft” by the overwhelming majority of the pilots responding to the survey.

The relative advantages of each of the three major travel modes studied (automobile, commercial airline, general aviation) were identified based on the survey results. For the automobile the most often cited advantage over GA transportation was the near elimination of weather as a factor in traveling. Although the lower expense of traveling by automobile when compared to GA aircraft was also cited as a major advantage, there is evidence that fixed costs (e.g. purchase price amortization, maintenance) are neglected for this transportation mode which is viewed as a necessity for everyday life. This renders the automobile as an unrealistically less expensive mode of transportation, and gives it an inherent advantage when compared to the expense of traveling by GA aircraft. Another significant advantage of travel by automobile is that it yields ready access to ground transportation at the destination, providing a true “doorstep-to-destination” travel mode without the concern of having to change modes to complete the trip.

The most often cited advantage of traveling by commercial airline was reduced travel time when compared to general aviation transportation, but only over longer trip distances where the higher cruise speeds of the airlines had a chance to overtake the time disadvantage of checking baggage, etc. Elimination of poor weather as a significant factor in traveling was also a key advantage the airlines held over GA travel, and at longer travel distances the airlines were considered to hold an advantage in lower travel expense, as well as if the traveler could plan ahead and purchase less expensive tickets in advance.

The top advantage of traveling by GA aircraft identified by those who took the survey was that it was faster than the alternative modes of travel, contingent on the trip distance. At shorter distances the automobile was a preferable travel mode in terms of doorstep-to-destination travel time, and the commercial airlines held the advantage at longer distances. The superior flexibility of traveling by GA aircraft was also cited as a major advantage, with those surveyed considering

their ability to alter travel schedule as well as destinations as a significant advantage. A third advantage cited was greater convenience, including access to a larger selection of destination airports (resulting in the ability to arrive closer to the final travel destination than with the commercial airlines), as well as avoiding the hassle of long lines at airline counters and various other airline delays. The simple satisfaction and pleasure of traveling by GA aircraft was also cited as a major advantage of the travel mode cited by many in the survey.

From the survey results, the following five key barriers to the utility of general aviation were identified: weather, expense of the travel mode, a lack of mobility at the destination, doorstep-to-destination travel time, and reduced access to GA transportation.

Weather was the most frequently cited factor considered in making travel mode choices, and nearly two-thirds of those responding to question 8 indicated weather as a major reason they would choose to not travel by general aviation. The uncertainty of weather conditions during a travel period works to directly reduce the utility of GA travel through reductions in the reliability of the travel mode. Unlike costs, weather is not a factor that discriminates as to how an individual accesses their GA transportation (e.g. rent or own an aircraft) so it is a factor that affects all GA users. Additionally, alternative travel modes have reduced risks associated with weather, and therefore hold an important advantage over GA travel. The reliability of GA transportation vis-à-vis weather and the cost of planning GA travel are coupled issues. If risks due to low reliability are to be mitigated, the risk of higher costs grows.

Responses in the utility survey focused on expense as a top decision factor in travel mode choice, and alternative travel modes were also perceived as holding a lower-cost advantage over general aviation, at least at certain trip distances. However, several factors suggest that GA is not as disadvantaged relative to other modes as expense alone would indicate, especially when the travel time and convenience are considered. It is also evident that costs do not affect all GA users equally, and that cost impacts are also dependent on the purpose of the travel. If a reduction in costs is desired, changing the basic business model to better share fixed costs is likely to be the most effective near-term solution.

The ability to access ground transportation to complete a trip was identified as a more important factor in choosing the travel mode than anticipated. This includes access to public transportation, taxis, or rental cars as well as the cost of the transportation. General aviation transportation was shown to be at a significant disadvantage to other modes of travel when considering the issue of mobility at the destination. The inability to complete the last few miles of any given trip can overcome any superior value of using GA as a transportation mode.

Reduced doorstep-to-destination travel time was identified as a valuable asset for GA transportation, especially if the true travel time and costs are considered for alternative transportation modes. However, the trip distance over which GA holds this advantage is quite limited, which in turn acts as an important barrier to the use of GA transportation. These threshold distances will depend on the speed and costs of the various travel modes as well as traveler characteristics such as the individual's value of time. However, a simple analysis also indicates that simply increasing GA aircraft cruise speeds will not necessarily translate into

higher utility for GA aircraft. Higher cruise speeds come at higher costs, which often offset the utility of the speed.

The greater convenience of GA travel, expressed as access to both aircraft and GA airports, is an important decision factor in making travel mode choices. Currently, those who typically rent aircraft rate access as a major factor in their choices to not travel by GA aircraft. For the overall survey population, convenience has not yet degraded to the point that it is significantly impacting mode choices. There is a good deal of concern in the pilot community surveyed for this research, however, that access (and convenience) is eroding with GA airport closures and employer travel restrictions. The issue of convenience is currently one of GA's major advantages, but many feel it is in danger of becoming a barrier to GA utility.

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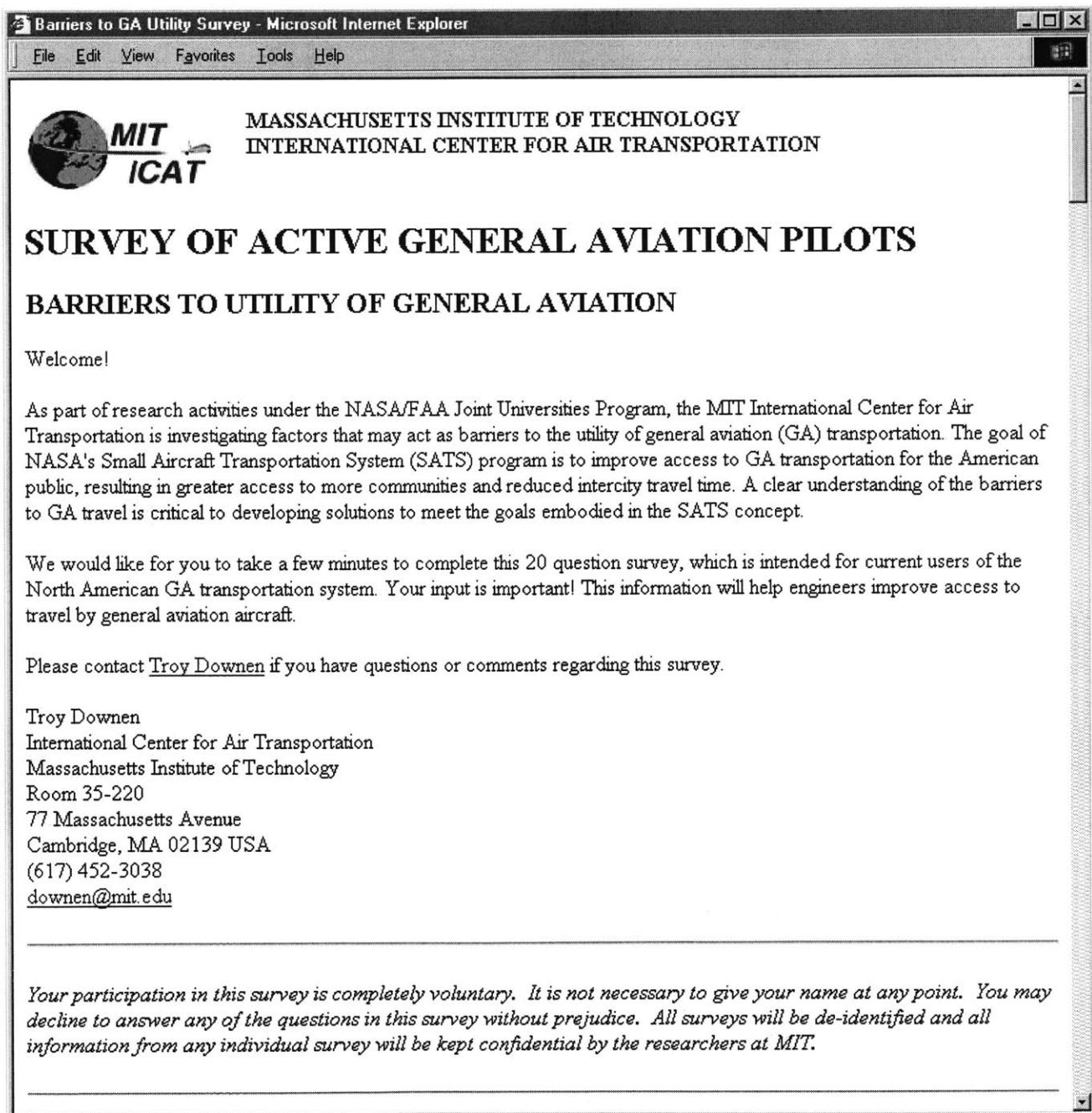
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APPENDIX A: SURVEY OF ACTIVE GENERAL AVIATION PILOTS


This appendix contains a complete copy of the web-based survey "Survey Of Active General Aviation Pilots: Barriers To Utility Of General Aviation." This survey was available to the public through the Massachusetts Institute of Technology web site, and was posted from late July, 2001 through September 10, 2001.



The screenshot shows a Microsoft Internet Explorer window titled "Barriers to GA Utility Survey - Microsoft Internet Explorer". The address bar is empty. The menu bar includes File, Edit, View, Favorites, Tools, and Help. The main content area features the MIT ICAT logo on the left and the text "MASSACHUSETTS INSTITUTE OF TECHNOLOGY INTERNATIONAL CENTER FOR AIR TRANSPORTATION" on the right. Below this, the title "SURVEY OF ACTIVE GENERAL AVIATION PILOTS" is displayed in a large, bold, serif font, followed by the subtitle "BARRIERS TO UTILITY OF GENERAL AVIATION" in a slightly smaller, bold, serif font. The text "Welcome!" is centered. A paragraph of text explains the survey's purpose: "As part of research activities under the NASA/FAA Joint Universities Program, the MIT International Center for Air Transportation is investigating factors that may act as barriers to the utility of general aviation (GA) transportation. The goal of NASA's Small Aircraft Transportation System (SATS) program is to improve access to GA transportation for the American public, resulting in greater access to more communities and reduced intercity travel time. A clear understanding of the barriers to GA travel is critical to developing solutions to meet the goals embodied in the SATS concept." Another paragraph states: "We would like for you to take a few minutes to complete this 20 question survey, which is intended for current users of the North American GA transportation system. Your input is important! This information will help engineers improve access to travel by general aviation aircraft." A line of text says: "Please contact [Troy Downen](#) if you have questions or comments regarding this survey." Below this is the contact information for Troy Downen: "Troy Downen
International Center for Air Transportation
Massachusetts Institute of Technology
Room 35-220
77 Massachusetts Avenue
Cambridge, MA 02139 USA
(617) 452-3038
downen@mit.edu". A horizontal line separates this from a final paragraph: "Your participation in this survey is completely voluntary. It is not necessary to give your name at any point. You may decline to answer any of the questions in this survey without prejudice. All surveys will be de-identified and all information from any individual survey will be kept confidential by the researchers at MIT." A vertical scrollbar is visible on the right side of the browser window.

Barriers to GA Utility Survey - Microsoft Internet Explorer

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 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
INTERNATIONAL CENTER FOR AIR TRANSPORTATION

SURVEY OF ACTIVE GENERAL AVIATION PILOTS

BARRIERS TO UTILITY OF GENERAL AVIATION

Welcome!

As part of research activities under the NASA/FAA Joint Universities Program, the MIT International Center for Air Transportation is investigating factors that may act as barriers to the utility of general aviation (GA) transportation. The goal of NASA's Small Aircraft Transportation System (SATS) program is to improve access to GA transportation for the American public, resulting in greater access to more communities and reduced intercity travel time. A clear understanding of the barriers to GA travel is critical to developing solutions to meet the goals embodied in the SATS concept.

We would like for you to take a few minutes to complete this 20 question survey, which is intended for current users of the North American GA transportation system. Your input is important! This information will help engineers improve access to travel by general aviation aircraft.

Please contact [Troy Downen](#) if you have questions or comments regarding this survey.

Troy Downen
International Center for Air Transportation
Massachusetts Institute of Technology
Room 35-220
77 Massachusetts Avenue
Cambridge, MA 02139 USA
(617) 452-3038
downen@mit.edu

Your participation in this survey is completely voluntary. It is not necessary to give your name at any point. You may decline to answer any of the questions in this survey without prejudice. All surveys will be de-identified and all information from any individual survey will be kept confidential by the researchers at MIT.

Barriers to GA Utility Survey - Microsoft Internet Explorer

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BACKGROUND INFORMATION

CERTIFICATES AND RATINGS

Certificate (please check one)

☐ Student
☐ Recreational
☐ Private
☐ Commercial
☐ Airline Transport

Instructor: ☐ I am CFI, CFII or MEI rated

Instrument Rating ☐ I am instrument rated ☐ I am a VFR pilot

Airplane Class Rating (check all that apply)

☐ Single Engine - Land ☐ Single Engine - Sea
☐ Multi Engine - Land ☐ Multi Engine - Sea

Type Rating(s):

FLIGHT EXPERIENCE

Total Flight Hours:

Which type of GA aircraft do you currently fly? (Please consider this aircraft when answering the remaining questions in this survey.)

☐ Single engine piston
☐ Multi engine piston
☐ Single engine turboprop
☐ Multi engine turboprop
☐ Jet less than 20,000 lbs MTOW (e.g. Cessna CJ1, Beechjet, Learjet 31, etc.)
☐ Jet 20,000 to 100,000 lbs MTOW (e.g. Hawker 800, Falcon, G-V, etc.)
☐ Large transport (e.g. Boeing BBJ, Airbus ACJ)

Where is your home base for the aircraft you indicated above? (Airport code or city & state)

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STATISTICAL INFORMATION

Gender: ☐ Male ☐ Female

Age:

GENERAL AVIATION USAGE

1. How many trips have you taken on any GA aircraft for the following purposes in the last 12 months: (a trip is defined as one flight from origin to destination plus return and any intermediate stops, or as one flight for training or recreational purposes)

Transportation to & from a business destination:	Transportation to & from a leisure/personal destination:	Pure recreation:	Training:	Other: Specify: <input type="text"/>
<input type="radio"/> 0 times	<input type="radio"/> 0 times	<input type="radio"/> 0 times	<input type="radio"/> 0 times	<input type="radio"/> 0 times
<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times
<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times
<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times
<input type="radio"/> 10+ times	<input type="radio"/> 10+ times	<input type="radio"/> 10+ times	<input type="radio"/> 10+ times	<input type="radio"/> 10+ times

2. How many trips have you taken on any scheduled airline (including commuters) for the following purposes in the last 12 months: (a trip is defined as one flight from origin to destination plus return and any intermediate transfers & layovers)

Transportation to & from a business destination:	Transportation to & from a leisure/personal destination:	Pure recreation:	Other: Specify: <input type="text"/>
<input type="radio"/> 0 times	<input type="radio"/> 0 times	<input type="radio"/> 0 times	<input type="radio"/> 0 times
<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times	<input type="radio"/> 1-2 times
<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times	<input type="radio"/> 3-5 times
<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times	<input type="radio"/> 6-9 times
<input type="radio"/> 10+ times	<input type="radio"/> 10+ times	<input type="radio"/> 10+ times	<input type="radio"/> 10+ times

3. When you fly on GA aircraft, how do you typically obtain the aircraft?

☐ Rent (e.g. from flying club, local FBO)

☐ Own a share in an aircraft through a fractional program

☐ Own a share in an aircraft through a partnership with one or more people

☐ Wholly own an aircraft

☐ Charter an aircraft

☐ Company flight department

☐ Other, specify:

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Barriers to GA Utility Survey - Microsoft Internet Explorer

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4. When you fly on GA aircraft are you typically the pilot in command?

☐ Yes

☐ No

BARRIERS TO GENERAL AVIATION

5. When you are making travel plans, which of the following transportation modes do you consider for any trip of 75 statute miles or greater? (check all that apply)

☐ Automobile (e.g. car, truck, van)

☐ Commercial airline

☐ Commercial bus (e.g. Greyhound)

☐ Commercial rail (e.g. Amtrak)

☐ General aviation

6. When evaluating GA transportation against other travel modes (car, airline, etc.), what factors are your major considerations in choosing among the various modes of transportation?

7. How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

8. Please list what you consider to be the major reasons you would choose *not* to travel by GA aircraft on any given trip (both business and personal/leisure)?

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Barriers to GA Utility Survey - Microsoft Internet Explorer

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9. Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

☐ Yes
☐ No
☐ Don't know
☐ Does not apply (self-employed, retired, etc.)

10a. For a *business* trip, how important to you are the following issues in choosing your mode of travel (e.g. car, bus, airline, GA)?

	Not Important	Somewhat Important	Very Important
Expense (cash outlay)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doorstep-to-destination travel time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort level (e.g. noise, space constraints, temperature)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The fun/pleasure of the travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility (e.g. the ability to alter departure time, alter destination)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability (e.g. getting to the destination at the time you planned)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal privacy (e.g. ability to hold a private conversation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to conduct business/work while traveling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobility at destination (e.g. access to a car)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10b. For a *leisure/personal* trip, how important to you are the following issues in choosing your mode of travel (e.g. car, bus, airline, GA)?

	Not Important	Somewhat Important	Very Important
Expense (cash outlay)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doorstep-to-destination travel time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort level (e.g. noise, space constraints, temperature)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The fun/pleasure of the travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility (e.g. the ability to alter departure time, alter destination)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability (e.g. getting to the destination at the time you planned)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal privacy (e.g. ability to hold a private conversation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to conduct business/work while traveling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobility at destination (e.g. access to a car)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Barriers to GA Utility Survey - Microsoft Internet Explorer

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11. Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft? Why?

12. Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

13. Over the last 5 years rate how often the following issues have factored into your decisions to *not* travel by GA aircraft:

	No Factor	Occasional Factor	A Factor	Frequent Factor
IFR weather	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Severe weather (e.g. icing, thunderstorms)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aircraft mechanical problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routine aircraft maintenance is not up to date	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not legally current as a pilot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concern regarding proficiency level of pilot (e.g. partial panel skills, night IFR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel companions are unwilling to fly GA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comfort of GA travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aircraft scheduling issues (e.g. unavailable due to conflicts with other owners, aircraft was not available over night)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Speed (alternative travel modes were faster)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost (alternative travel modes were less expensive)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenience (alternative travel modes were more easily utilized)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airspace congestion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of service facilities at destination or en route airports (e.g. food, toilet, phone)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of mobility while at destination (e.g. access to other transportation modes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insurance restrictions (e.g. minimum pilot qualifications for aircraft)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insurance costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

Done My Computer

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15. What advantages does traveling by automobile have over travel by GA aircraft?

16. What advantages does traveling by scheduled airline have over travel by GA aircraft?

17. What would you estimate are your costs to fly 100 statute miles (consider the aircraft you identified earlier)?
\$

What items create this cost?

18. What would you estimate are your costs to drive a car 100 statute miles? \$

What items create this cost?

IMPROVING GENERAL AVIATION UTILITY

19. What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

Done My Computer

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20. Consider a dispatch service being made available to general aviation, offering support similar to that which is available to airlines (pre-flight planning, in-flight information and decision support, weight & balance computations, etc.). Assuming this service was also recognized by insurance companies as a way to reduce insurance premium costs, would you be interested in purchasing the service? How much would you be willing to pay per flight for the service?

If you have any additional comments, we would like to hear them!
Remember, since this survey is anonymous, we will have no way of directly answering questions submitted here.

You have reached the end of the survey.

You may now submit this precious data to MIT researchers via email by pressing the submit button.
Please contact Troy Downen if you have any further feedback.

Thank you!

Submit Via Email

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Revised: August 23, 2001

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APPENDIX B: SURVEY RESULTS

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B1 INTRODUCTION

This appendix contains a complete listing of all 1,471 survey responses, categorized as discussed in Section 2.2.2. The survey responses were also sorted by four participant characteristics: aircraft owners, aircraft renters, heavy users of general aviation for travel, and heavy users of commercial airlines for travel. The survey data is also presented in this appendix for these four alternative sortings.

Aircraft owners and renters were identified in survey question 3, with 480 survey participants typically renting their aircraft and 670 wholly owning their aircraft.

“Heavy GA users” were identified as those who indicated in question 1 that 10+ trips were taken in the last 12 months on any GA aircraft for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Seven hundred and twenty-three (723) survey participants were categorized as “heavy GA users.”

“Heavy airline users” were identified as those who indicated in question 1 that 10+ trips were taken in the last 12 months on any scheduled airline for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Two hundred and fourteen (214) survey participants were categorized as “heavy airline users.”

B2 SURVEY RESULTS: GENERAL SURVEY POPULATION

The figures in this section represent the data for the entire survey population of 1,471 responses. The data is presented in the order in which the questions were presented in the survey. See Appendix A for a complete copy of the survey.

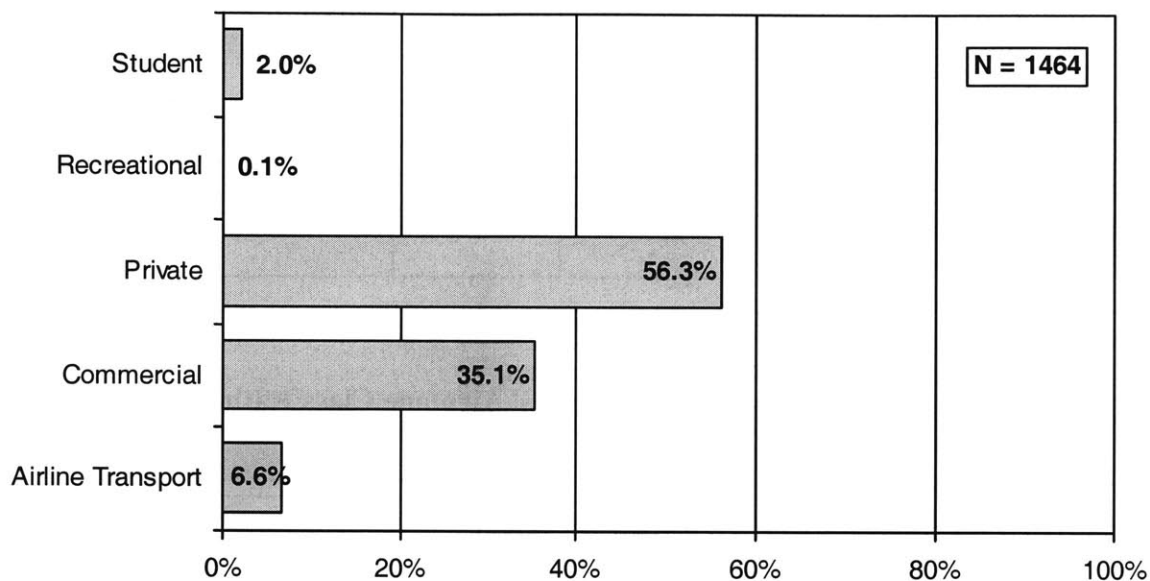


Figure B 1: Survey Respondents' Pilot Certificate

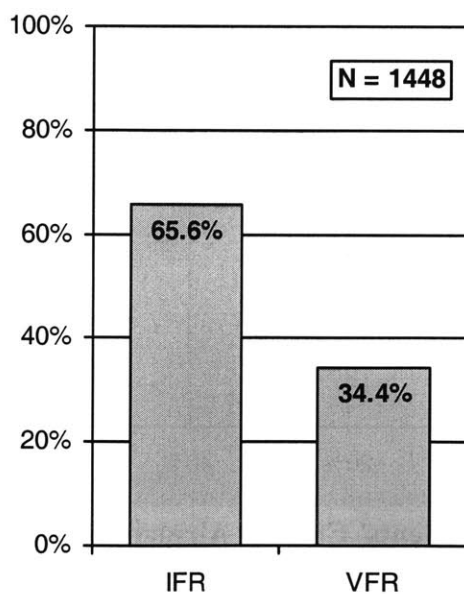


Figure B 2: Survey Respondents' Instrument Rating

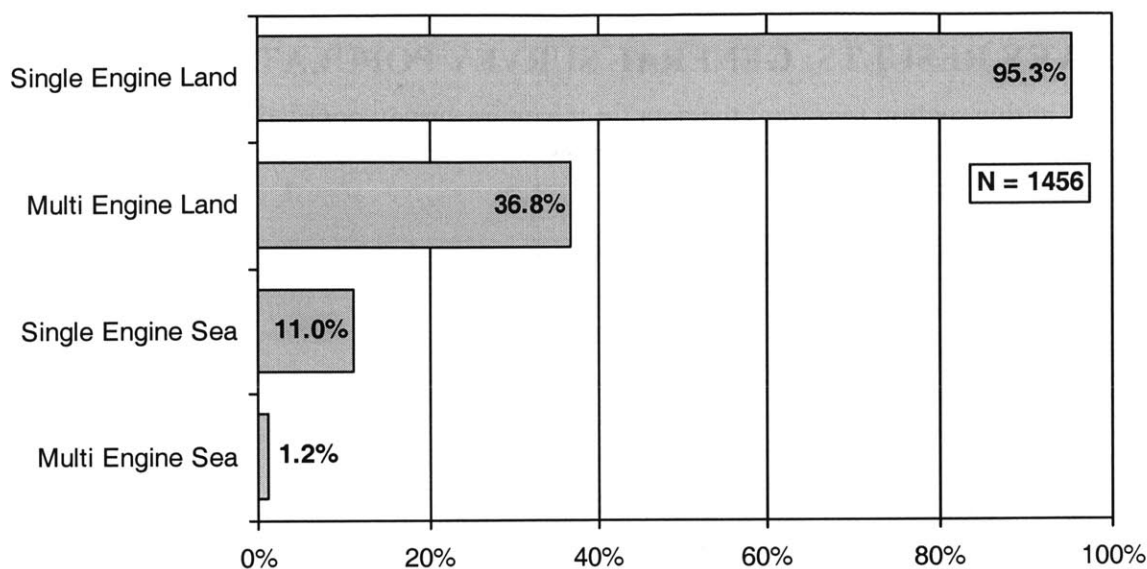


Figure B 3: Survey Respondents' Airplane Class Rating

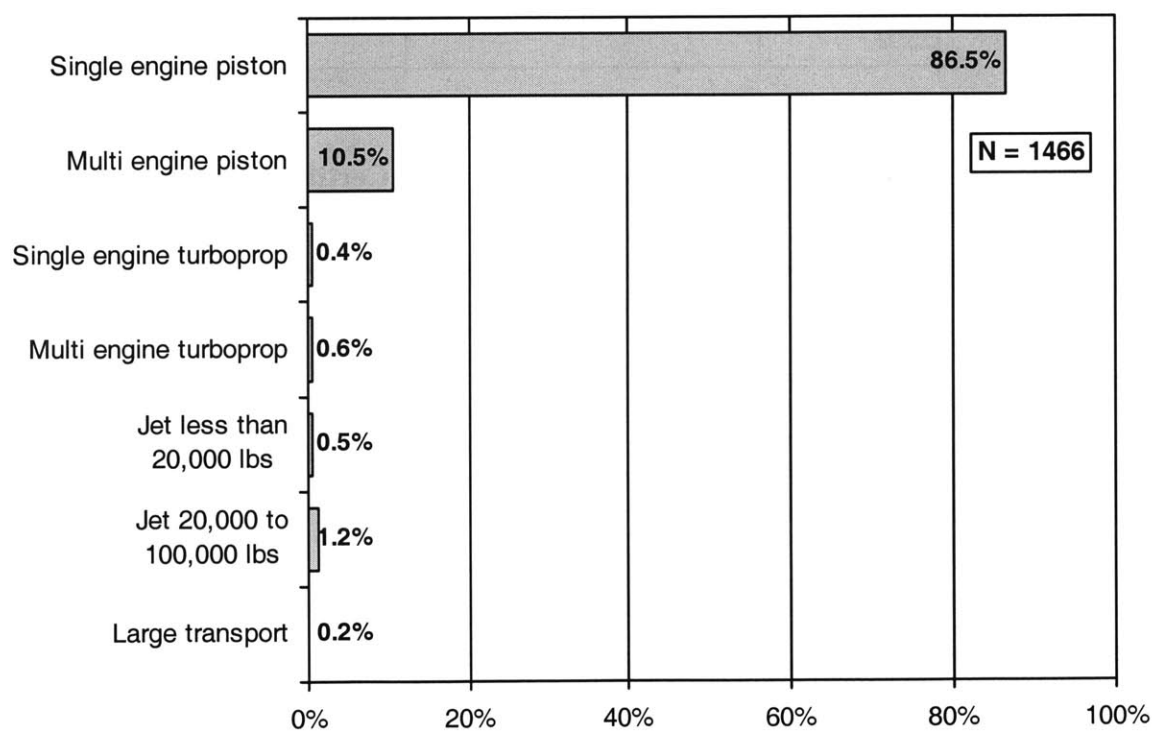


Figure B 4: Survey Respondents' Current Airplane Type Considered for the Survey

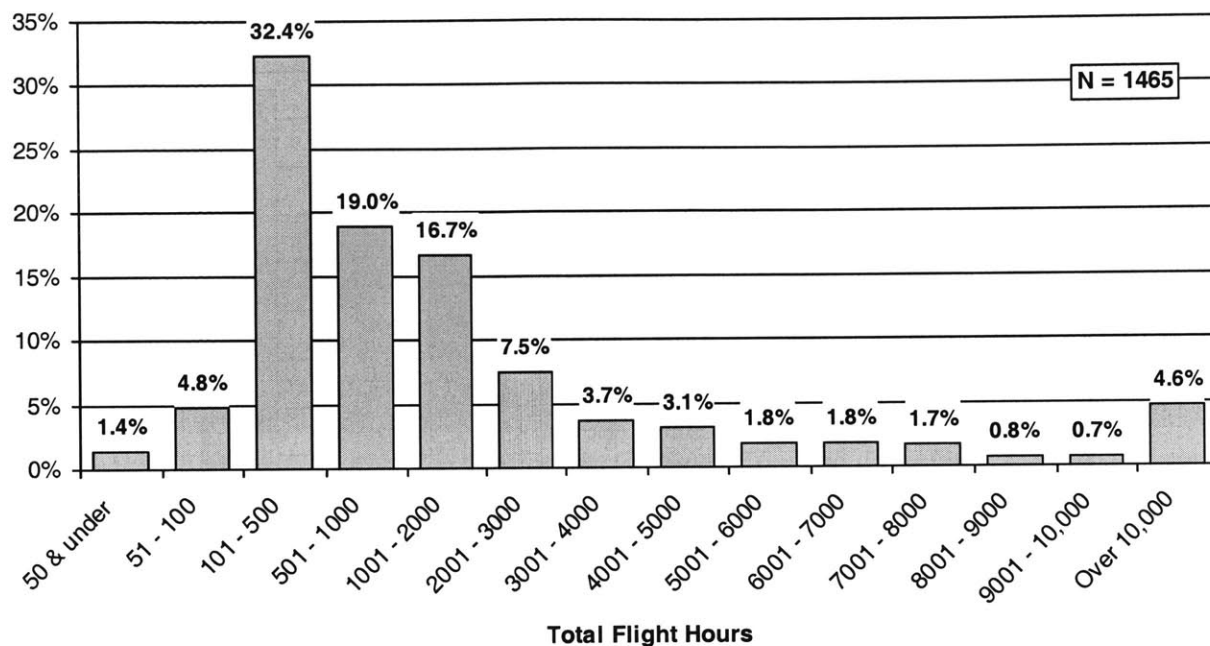


Figure B 5: Survey Respondents' Total Flight Hours

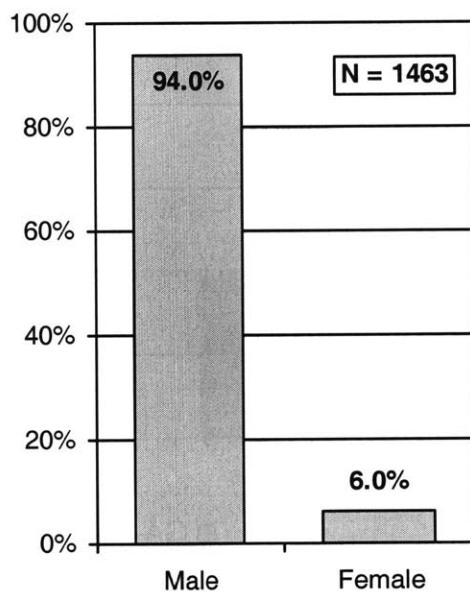


Figure B 6: Survey Respondents' Gender

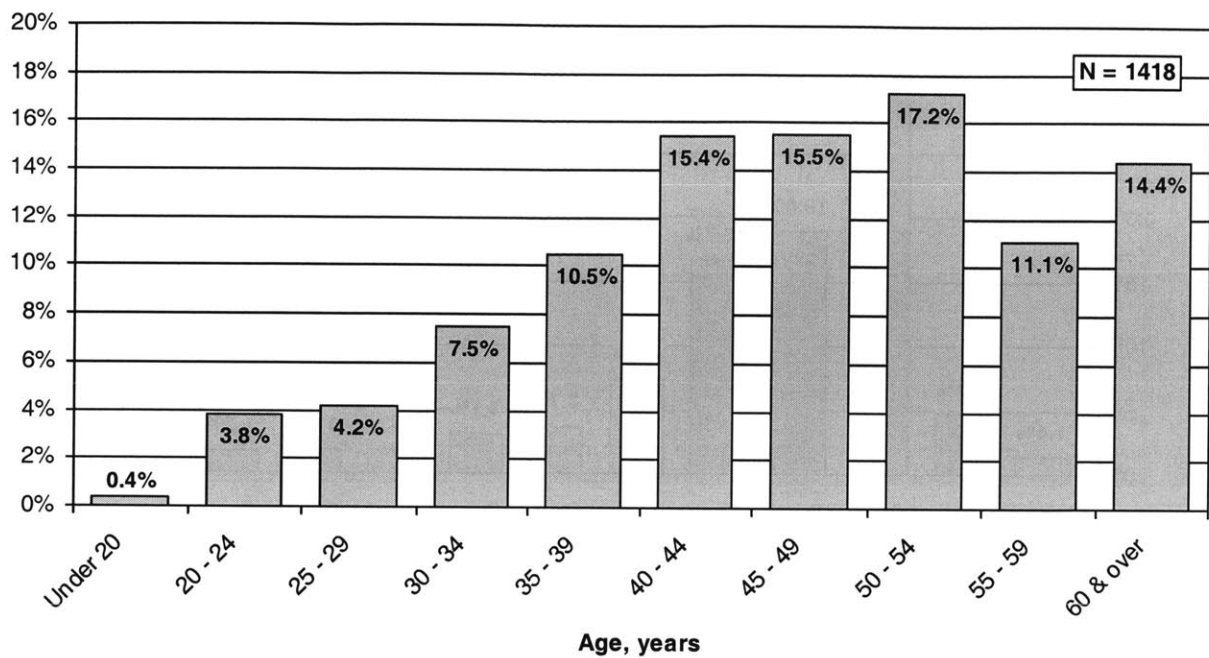


Figure B 7: Survey Respondents' Age

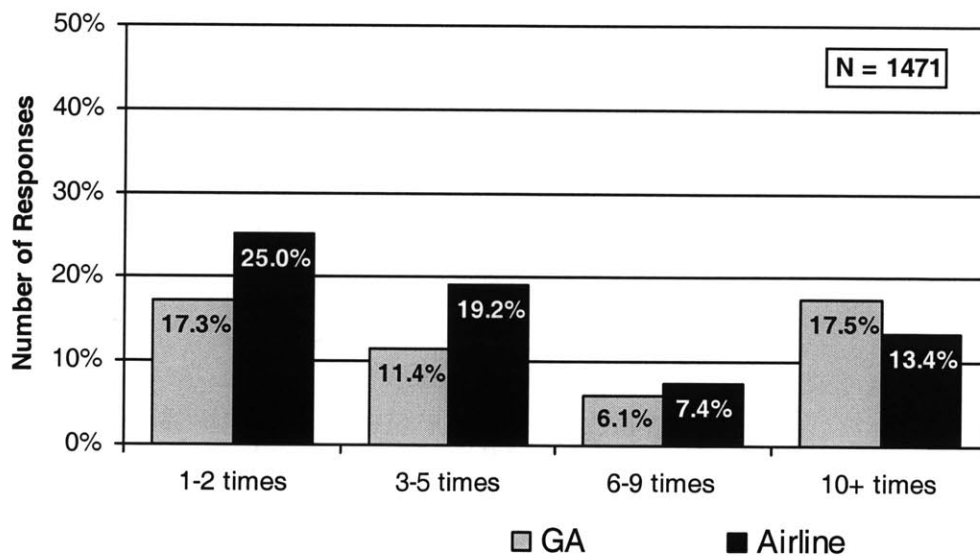


Figure B 8: Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

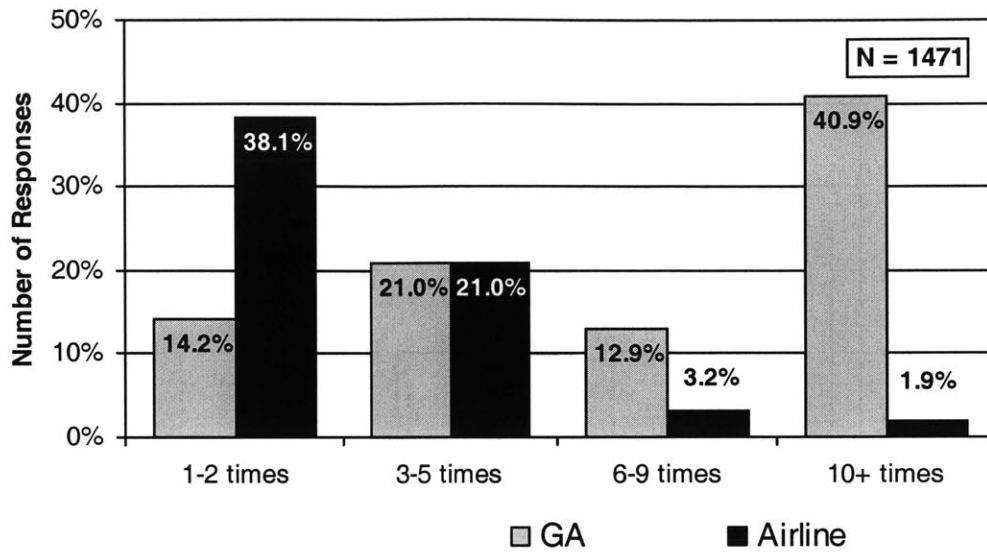


Figure B 9: Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

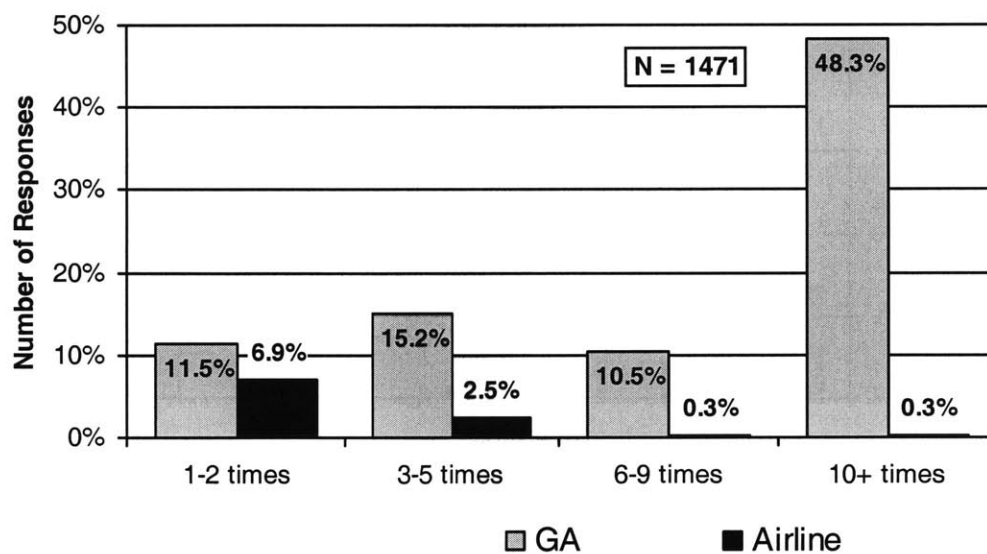


Figure B 10: Q1 & Q2 - Trips Taken For Pure Recreation

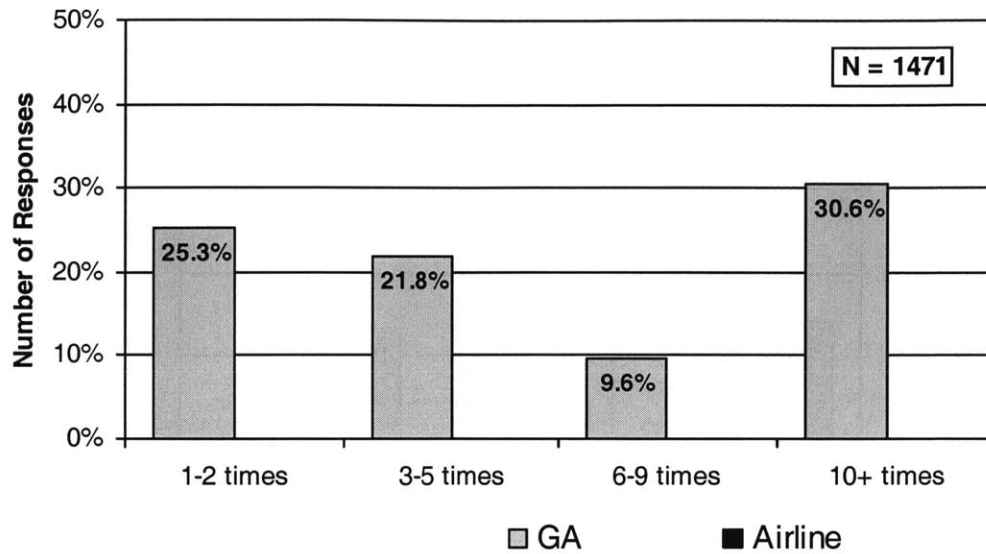


Figure B 11: Q1 & Q2 - Trips Taken For Training

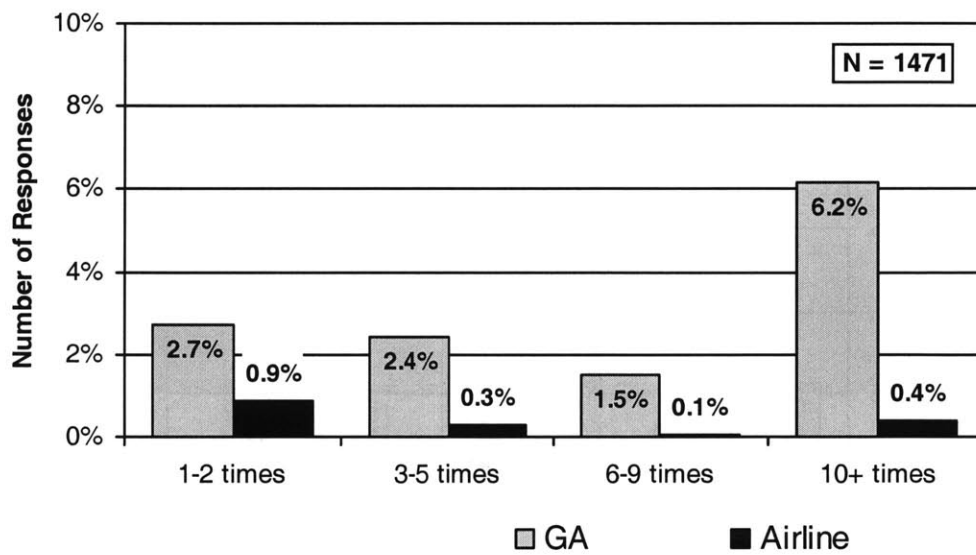


Figure B 12: Q1 & Q2 - Trips Taken For Other Purposes

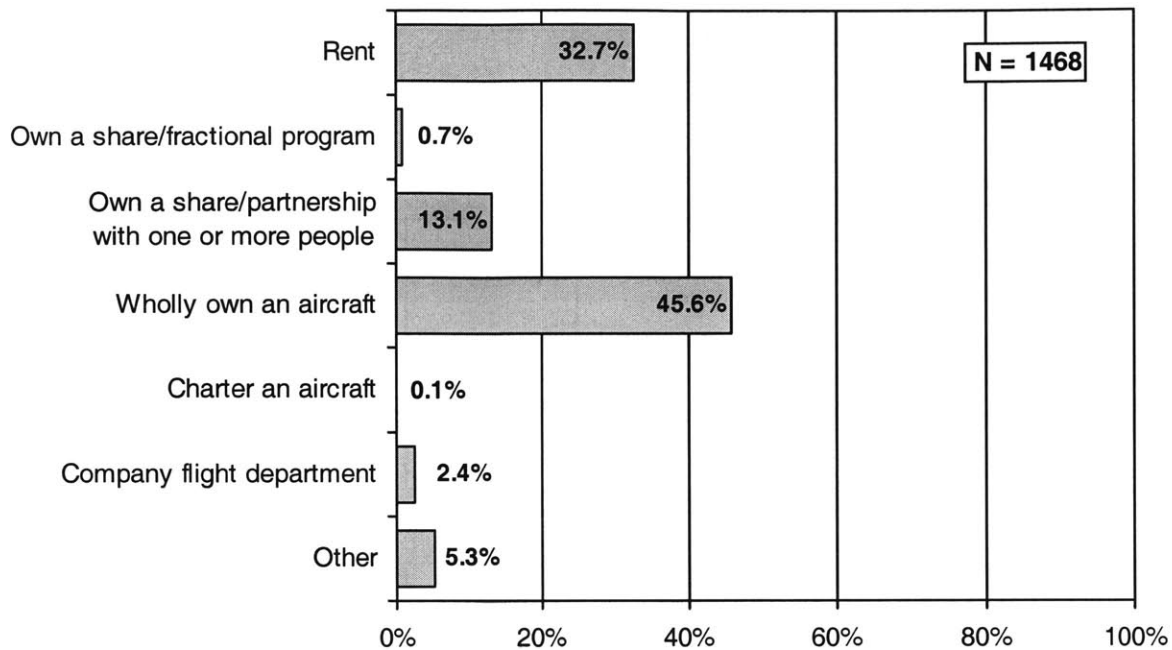


Figure B 13: Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

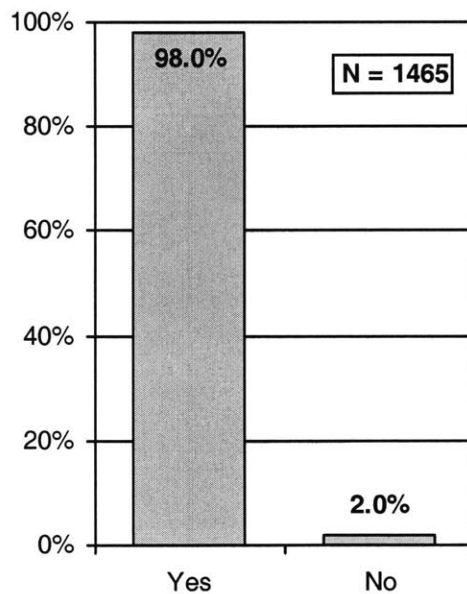


Figure B 14: Q4 - When you fly on GA aircraft are you typically the pilot in command?

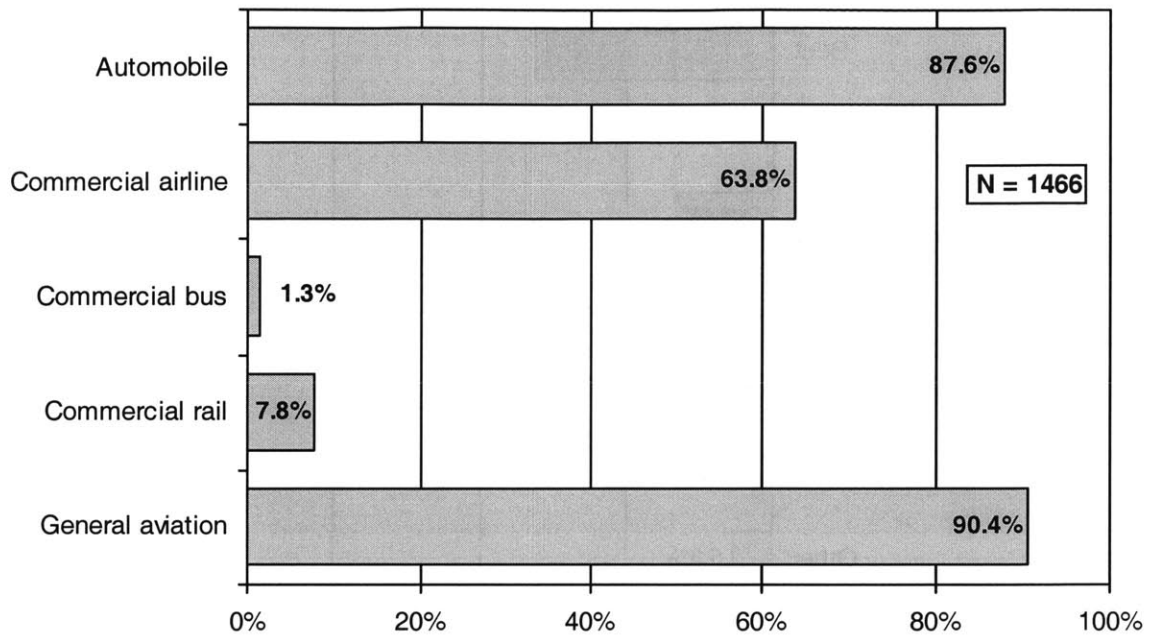


Figure B 15: Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

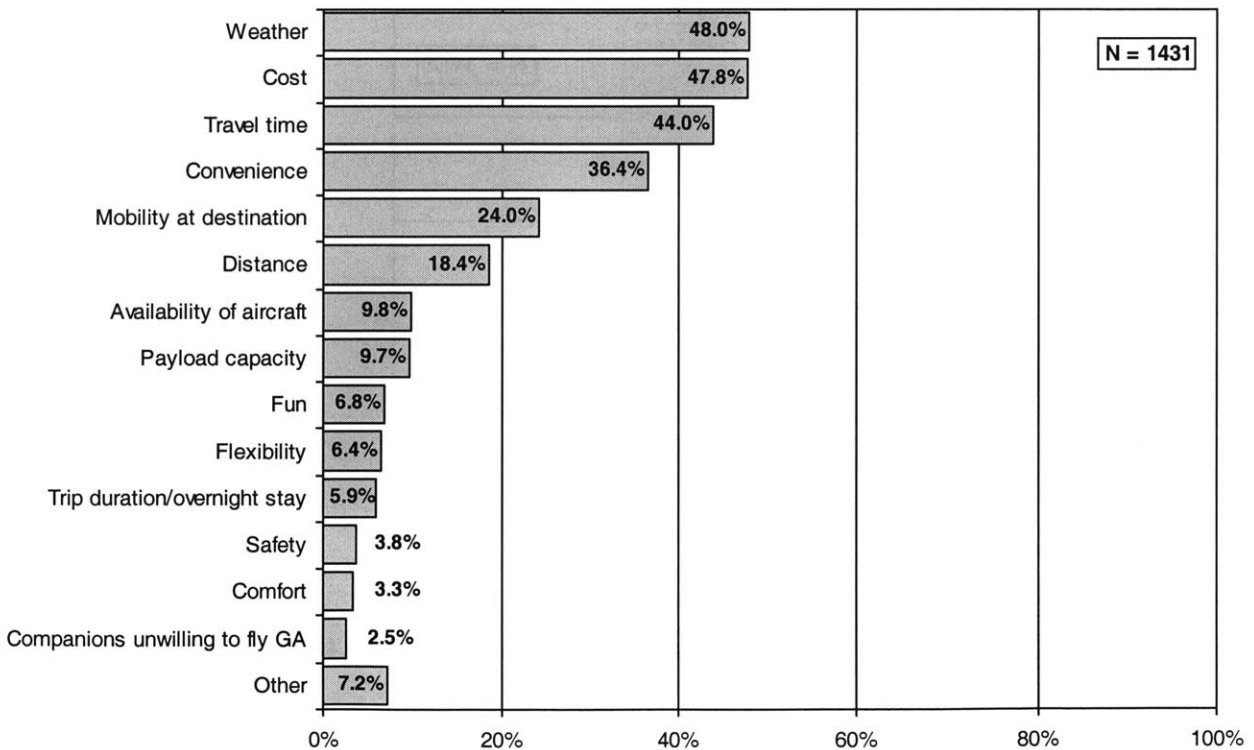


Figure B 16: Q6 - What factors are your major considerations in choosing among the various modes of transportation?

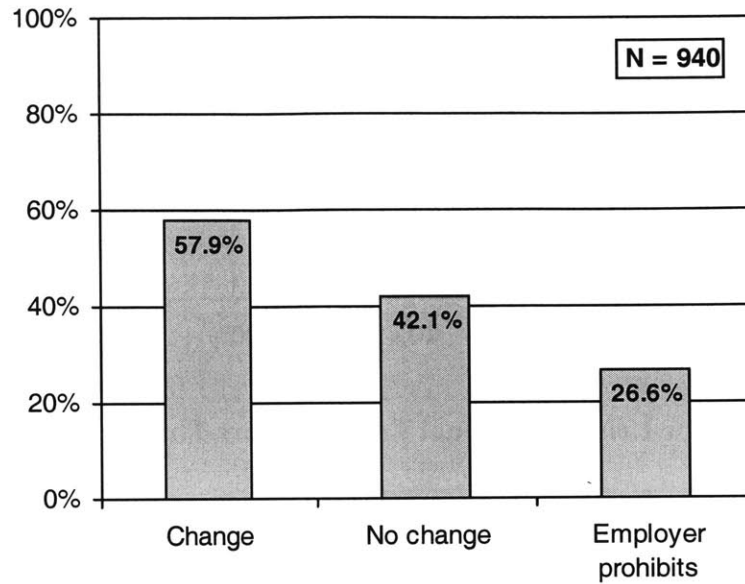


Figure B 17: Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

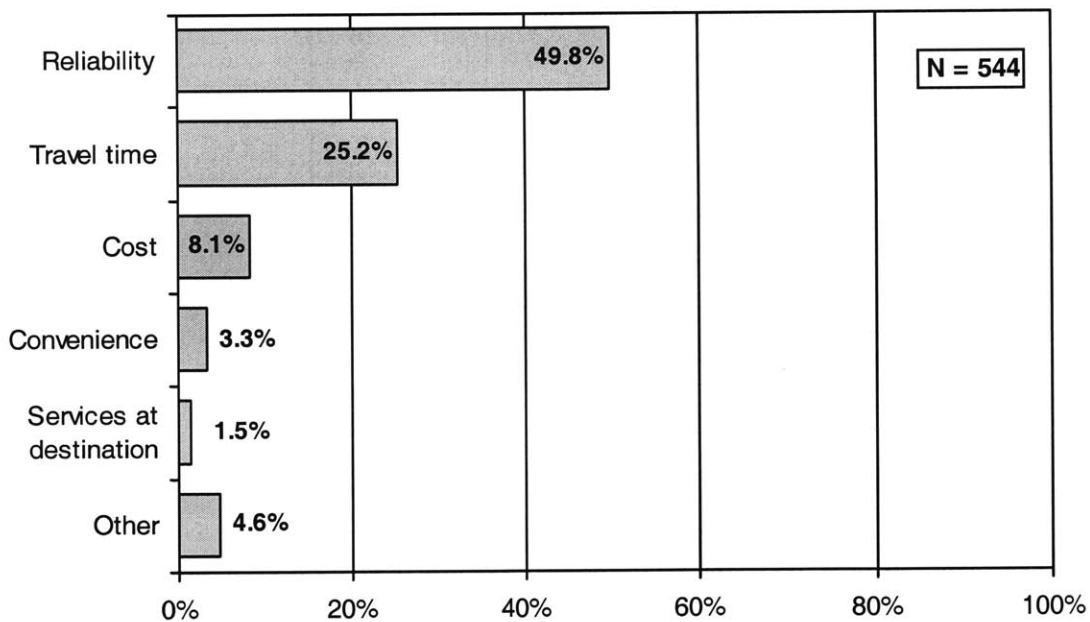


Figure B 18: Q7 - For Business Trips: Factors That Become More Important

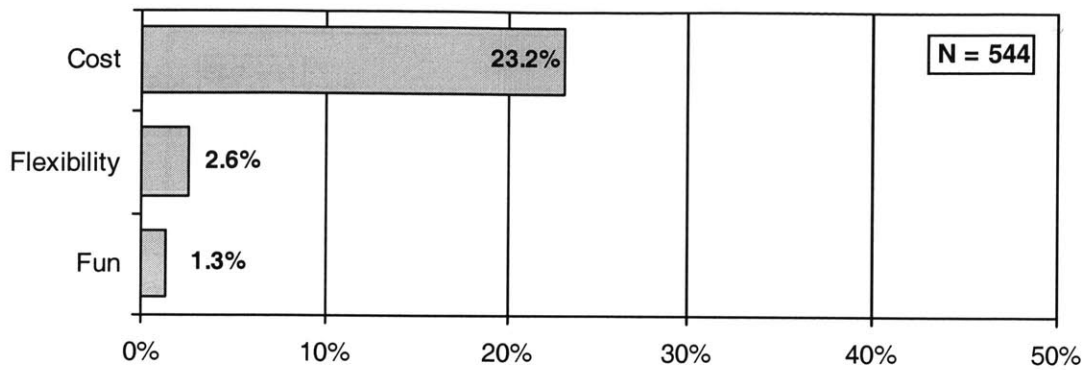


Figure B 19: Q7 - For Leisure/Personal Trips: Factors That Become More Important

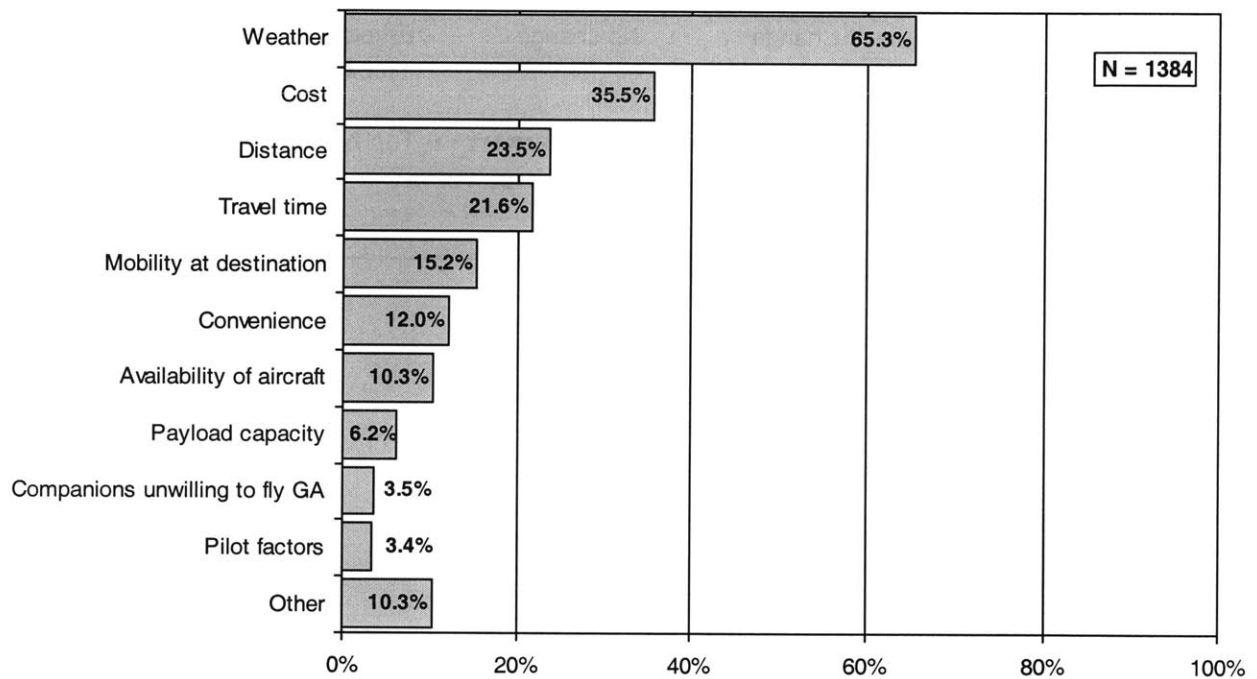


Figure B 20: Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

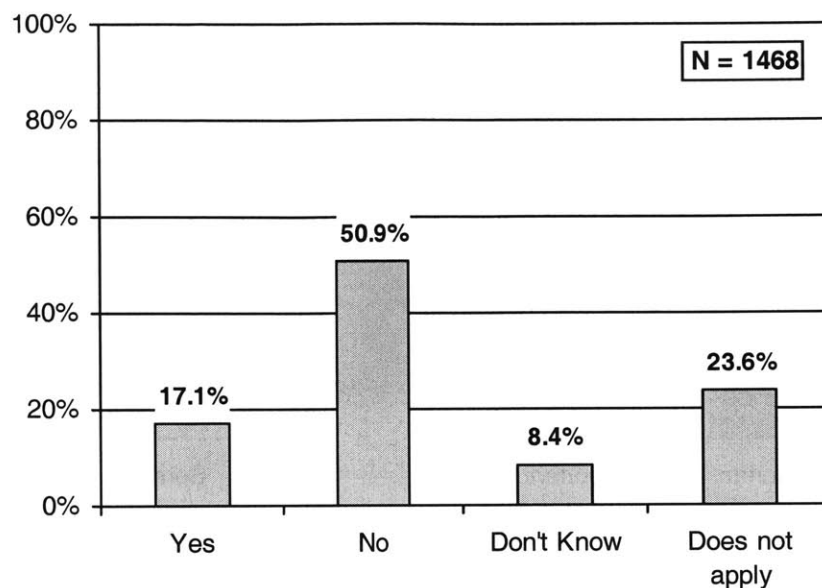


Figure B 21: Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

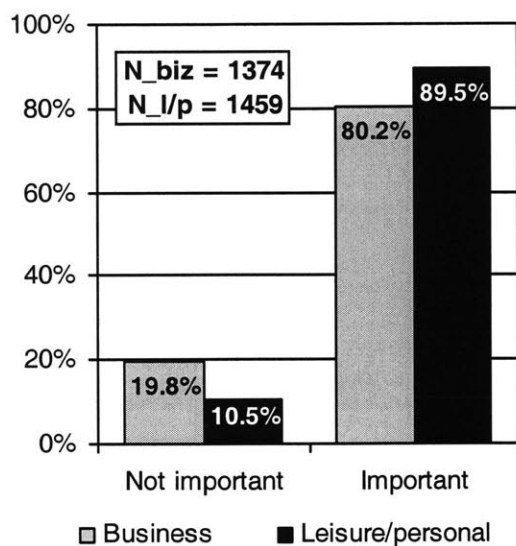


Figure B 22: Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

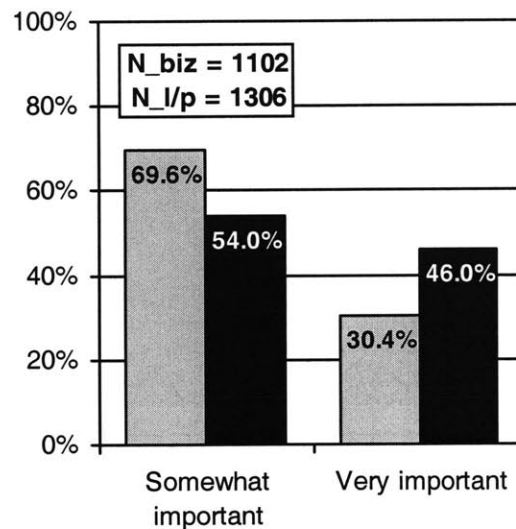


Figure B 23: Q10 – (Expense) Of those who rated the issue "important," the degree to which they considered it important

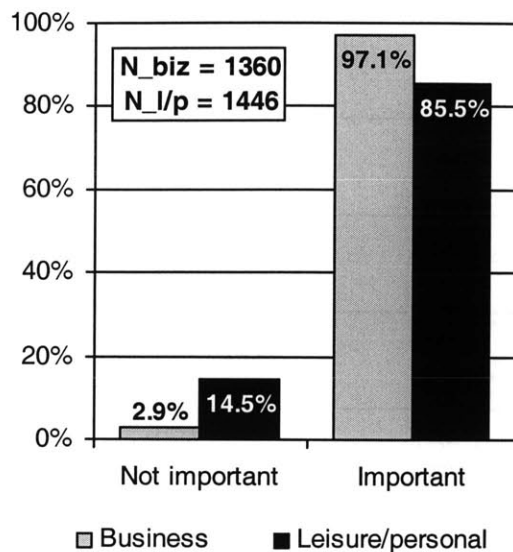


Figure B 24: Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

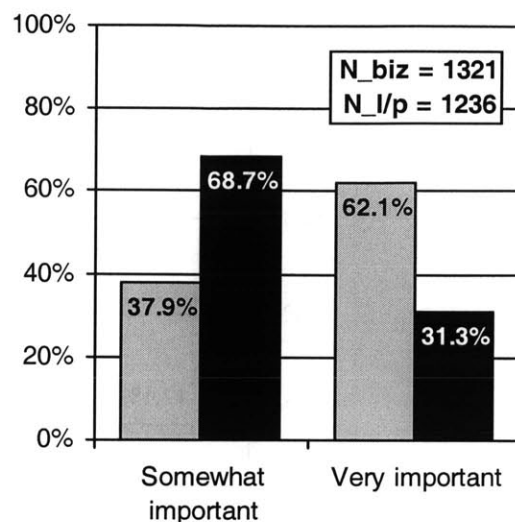


Figure B 25: Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

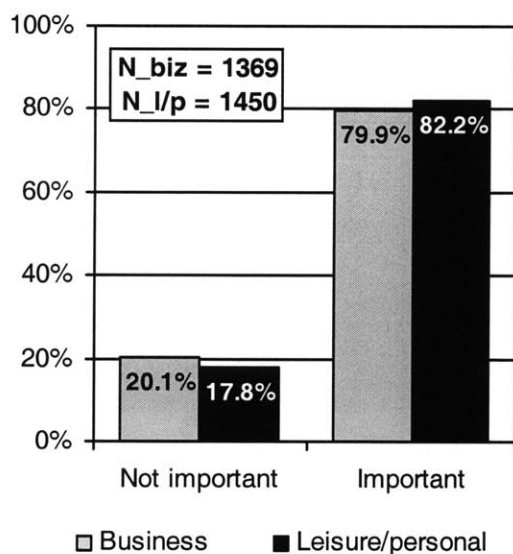


Figure B 26: Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

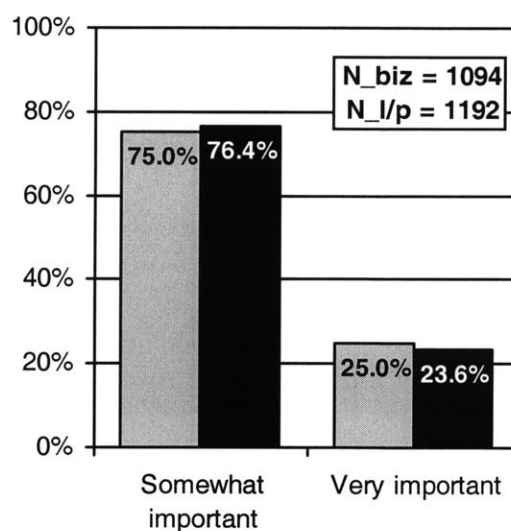


Figure B 27: Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

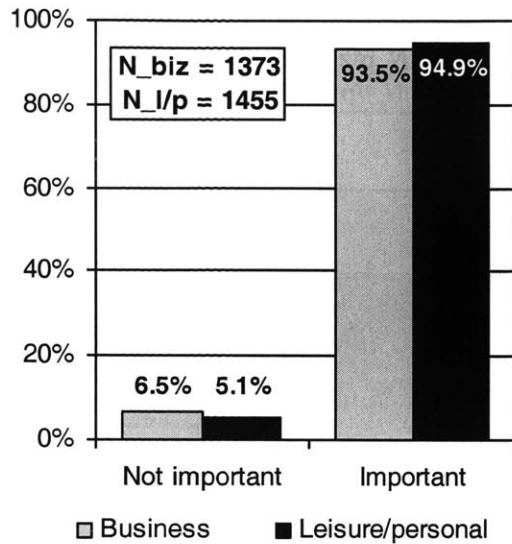


Figure B 28: Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

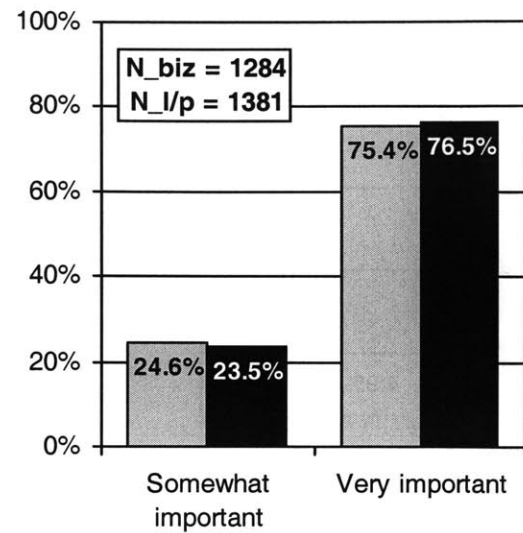


Figure B 29: Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

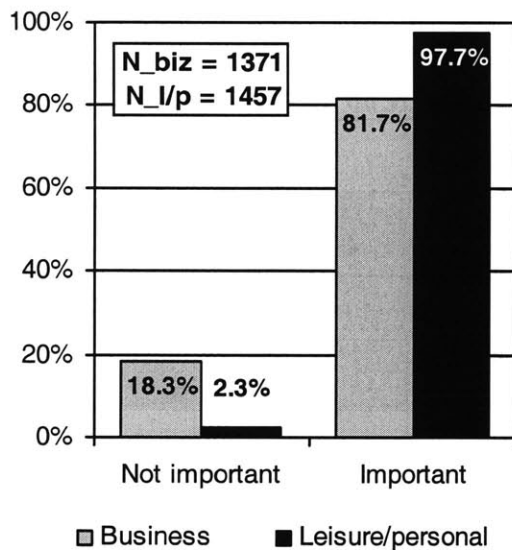


Figure B 30: Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

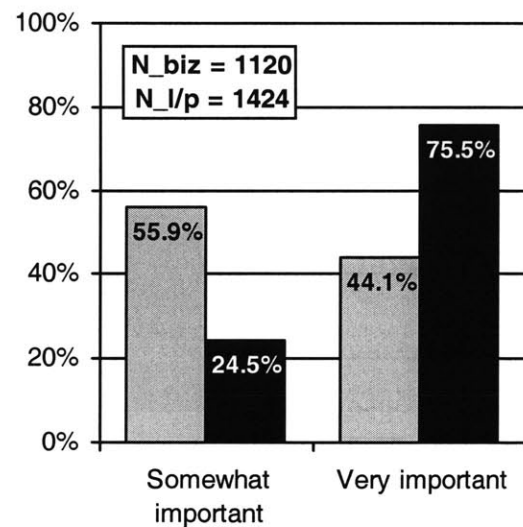


Figure B 31: Q10 – (Fun) Of those who rated the issue “important,” the degree to which they considered it important

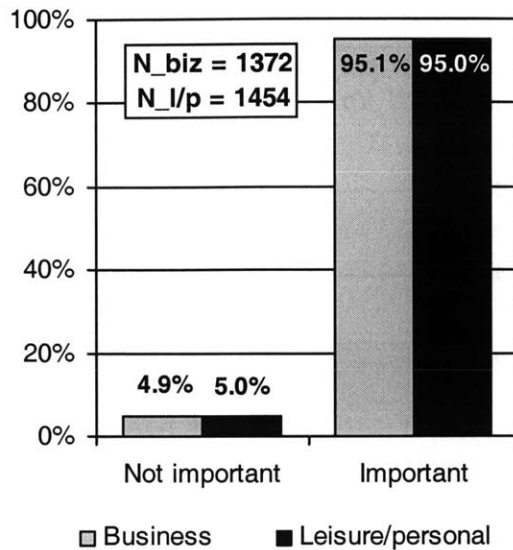


Figure B 32: Q10 – (Flexibility) How important to you are the following issues in choosing your mode of travel?

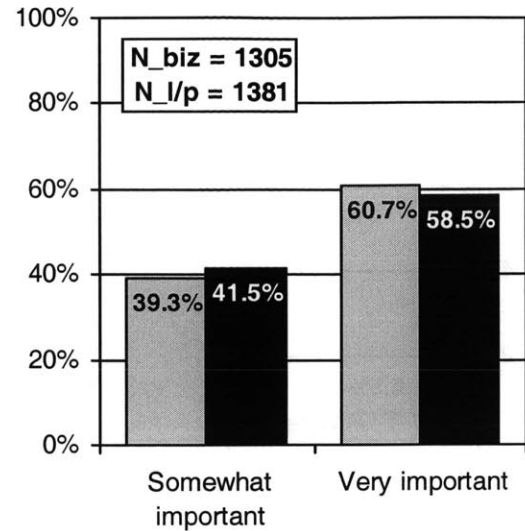


Figure B 33: Q10 – (Flexibility) Of those who rated the issue “important,” the degree to which they considered it important

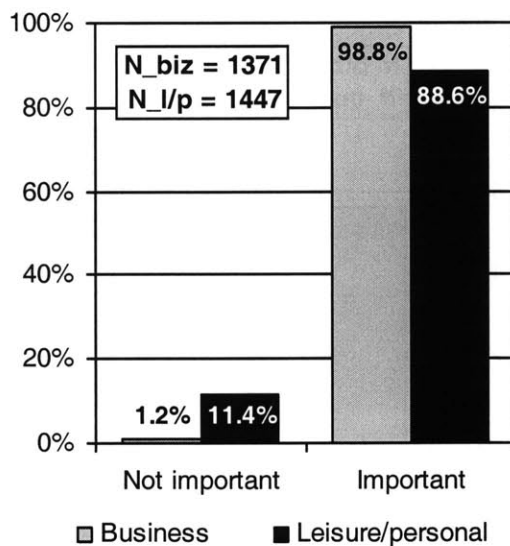


Figure B 34: Q10 – (Reliability) How important to you are the following issues in choosing your mode of travel?

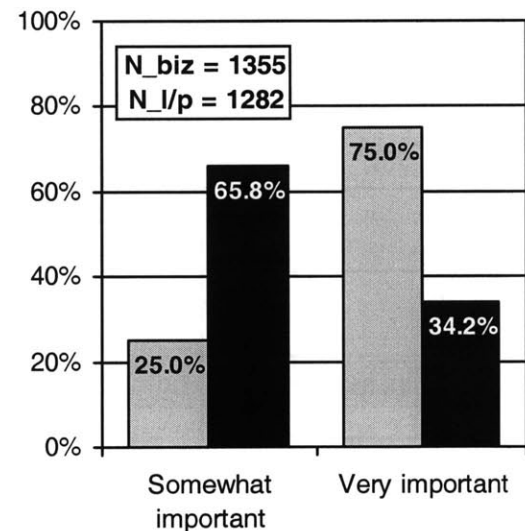


Figure B 35: Q10 – (Reliability) Of those who rated the issue “important,” the degree to which they considered it important

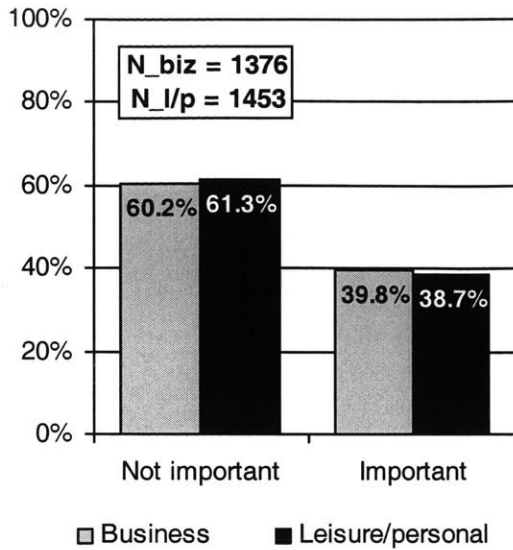


Figure B 36: Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

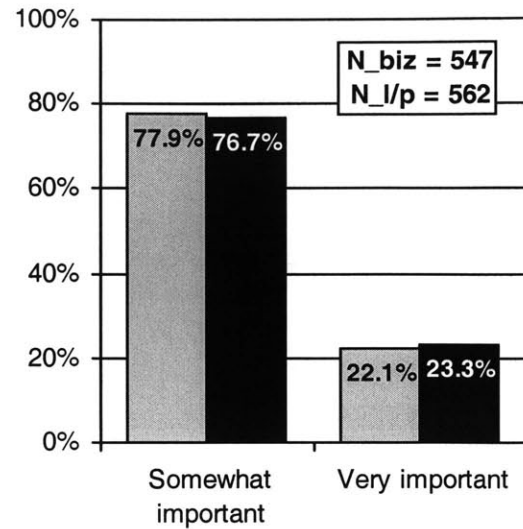


Figure B 37: Q10 – (Privacy) Of those who rated the issue "important," the degree to which they considered it important

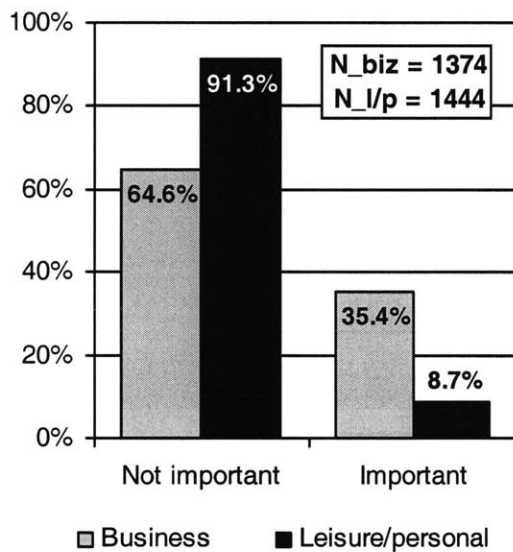


Figure B 38: Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

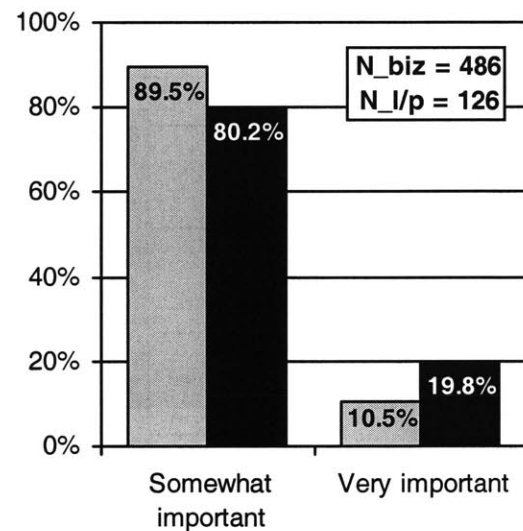


Figure B 39: Q10 – (Conduct Business) Of those who rated the issue "important," the degree to which they considered it important

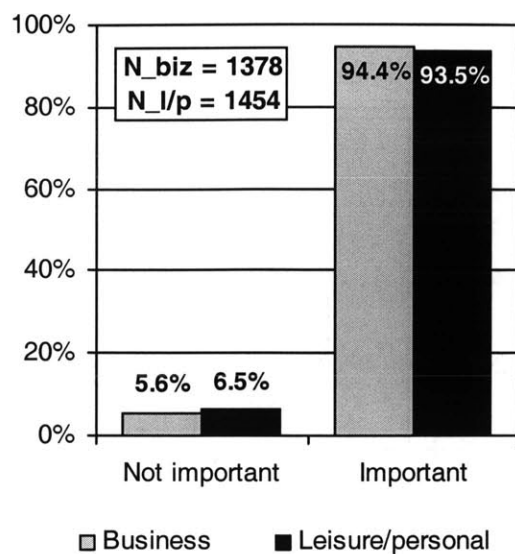


Figure B 40: Q10 – (Mobility) How important to you are the following issues in choosing your mode of travel?

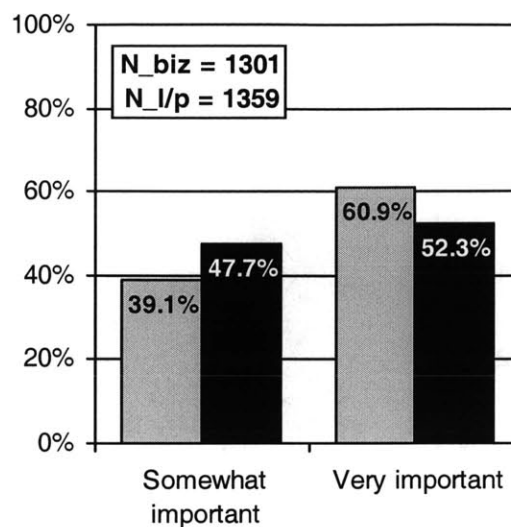


Figure B 41: Q10 – (Mobility) Of those who rated the issue “important,” the degree to which they considered it important

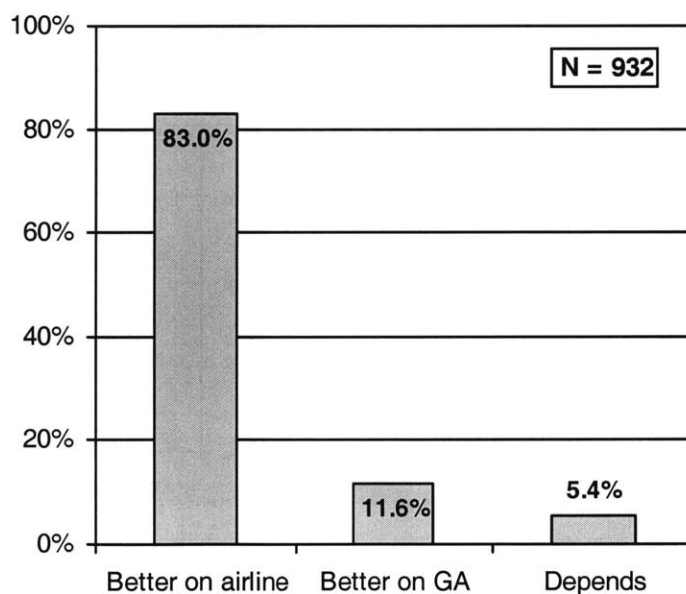


Figure B 42: Q11 - Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft?

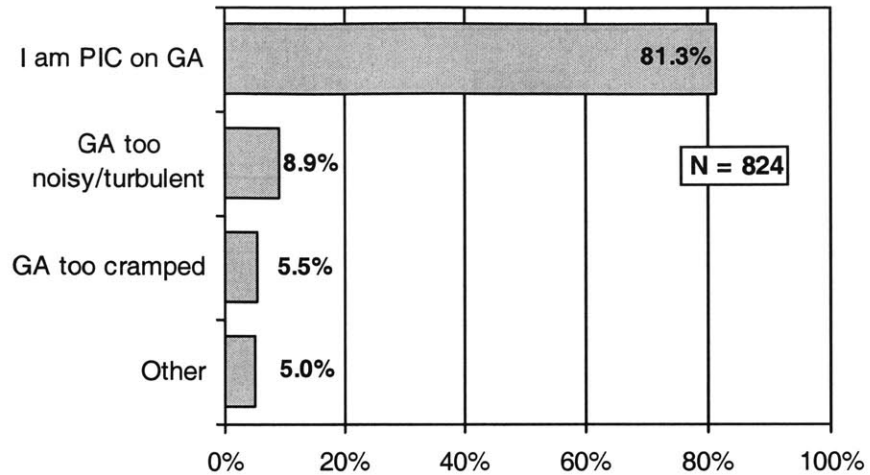


Figure B 43: Q11 - Ability to work is better on airline because...

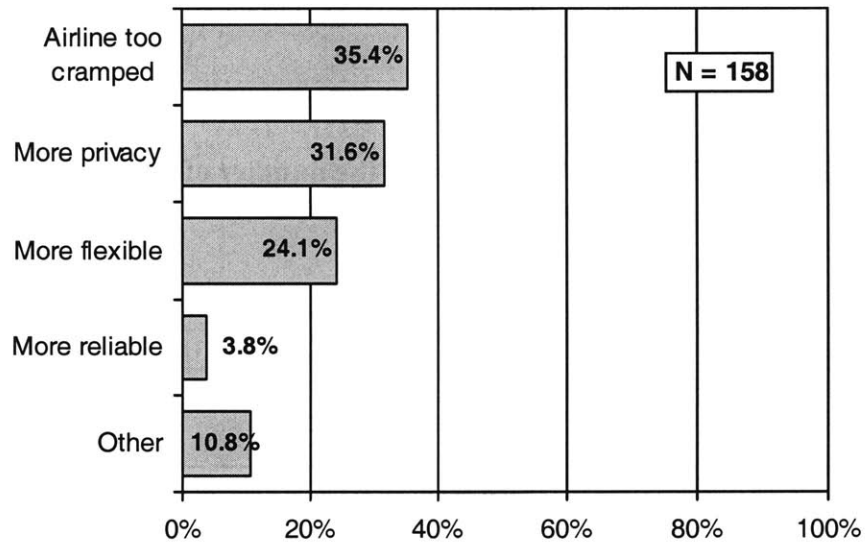


Figure B 44: Q11 - Ability to work is better on GA because...

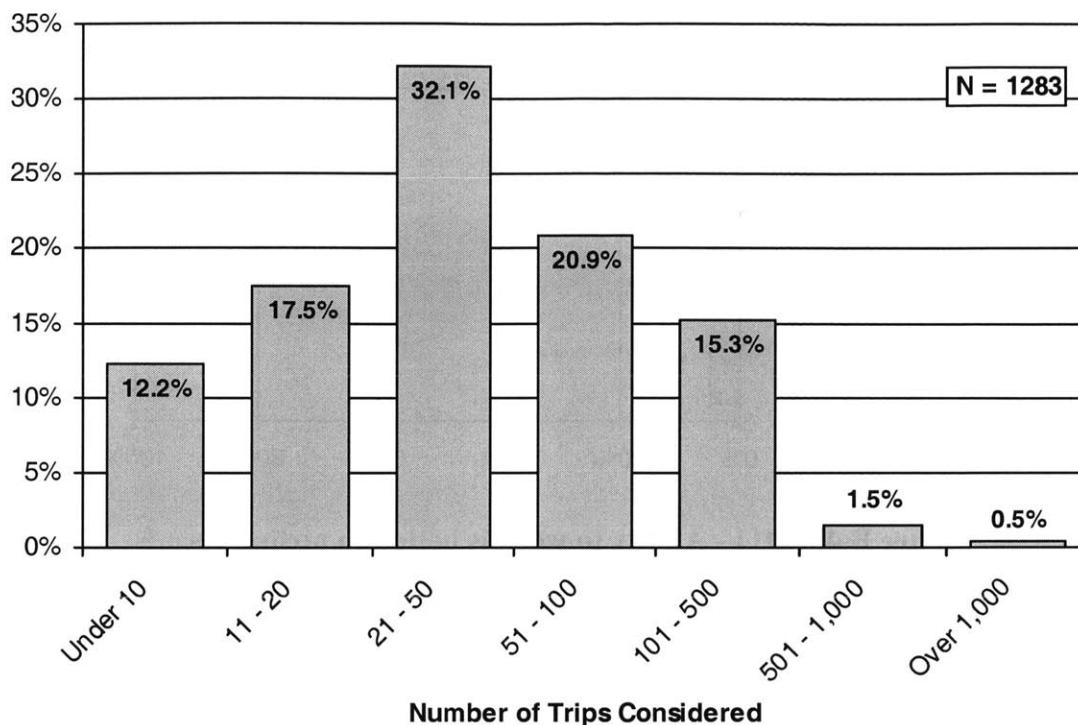


Figure B 45: Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

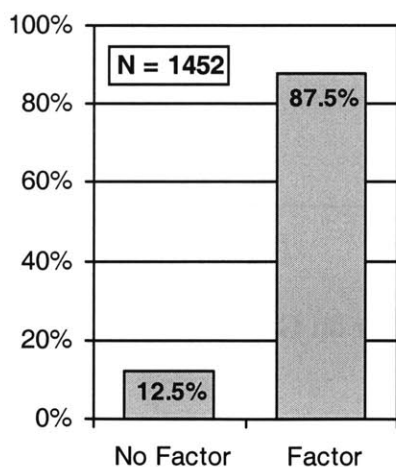


Figure B 46: Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

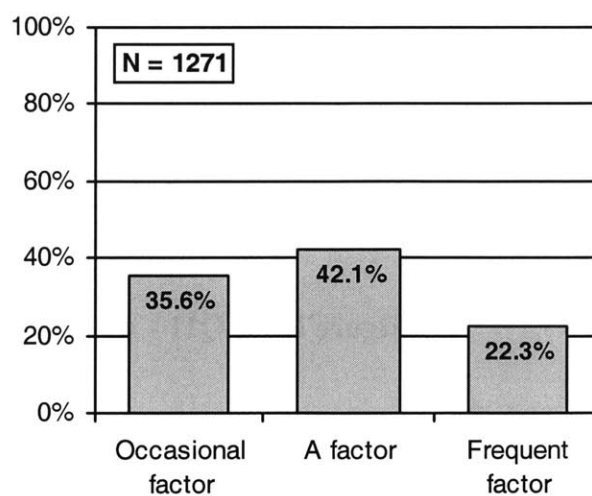


Figure B 47: Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

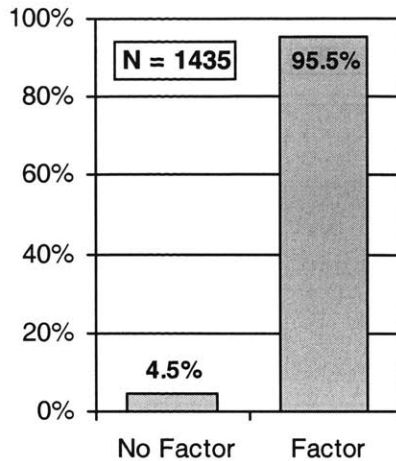


Figure B 48: Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

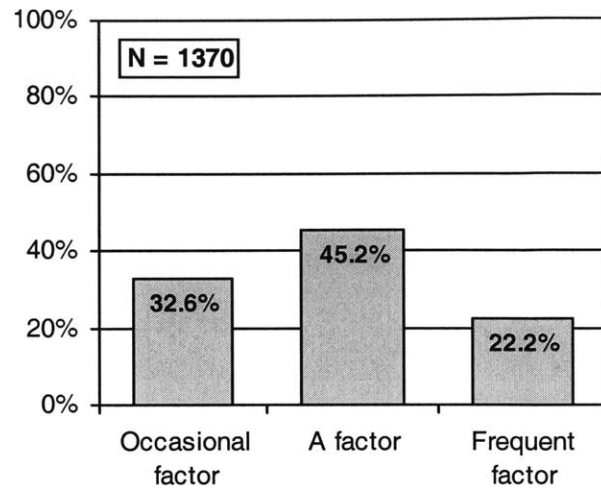


Figure B 49: Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

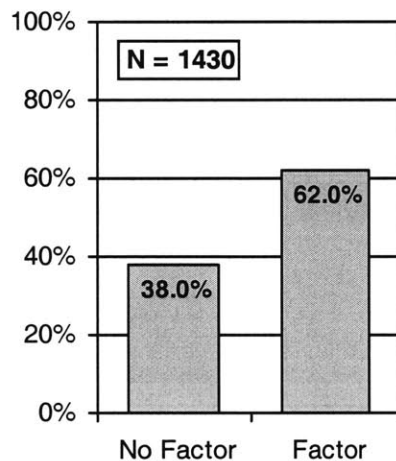


Figure B 50: Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

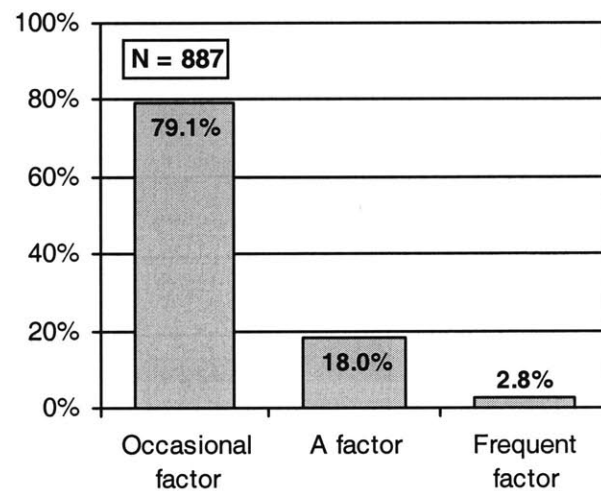


Figure B 51: Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

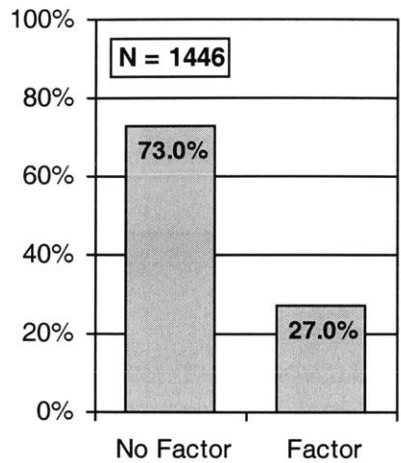


Figure B 52: Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

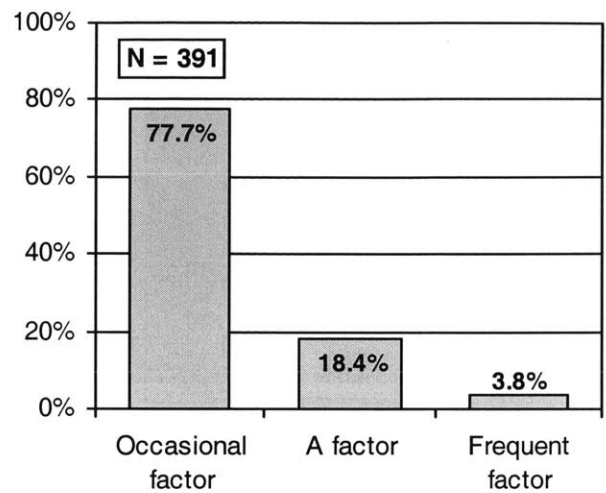


Figure B 53: Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

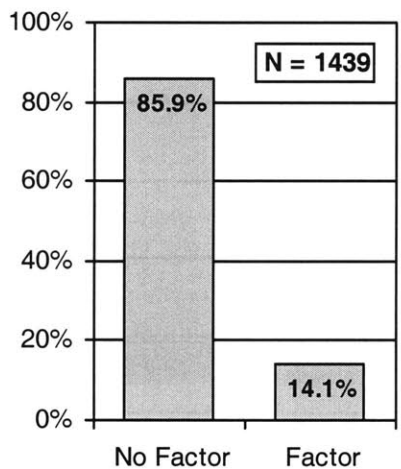


Figure B 54: Q13 – (Not Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

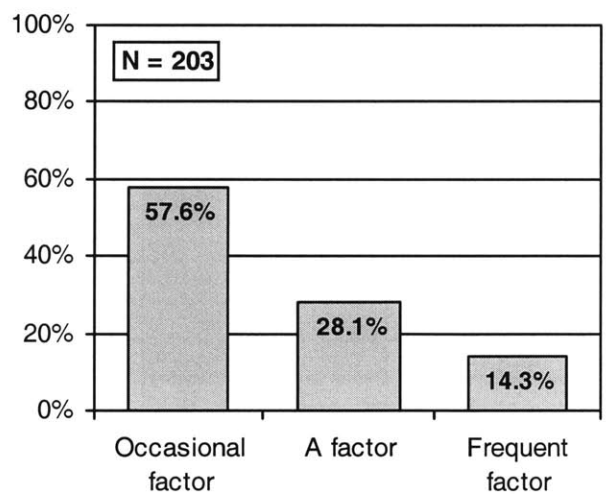


Figure B 55: Q13 – (Not Current) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

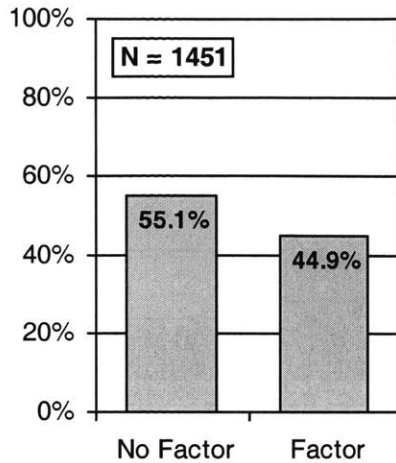


Figure B 56: Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

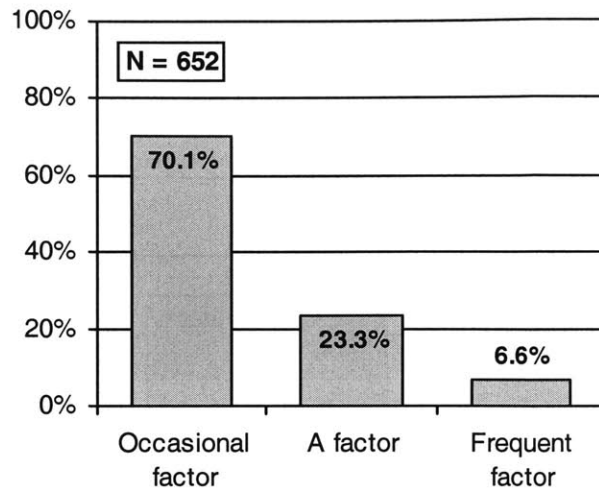


Figure B 57: Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

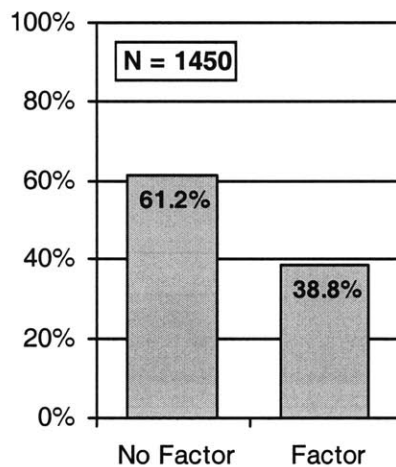


Figure B 58: Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

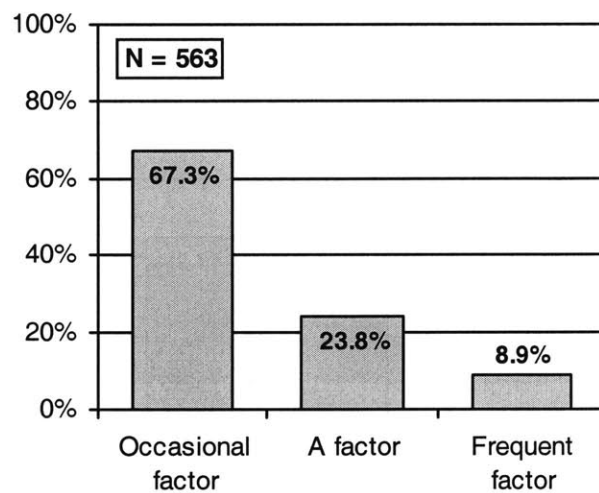


Figure B 59: Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

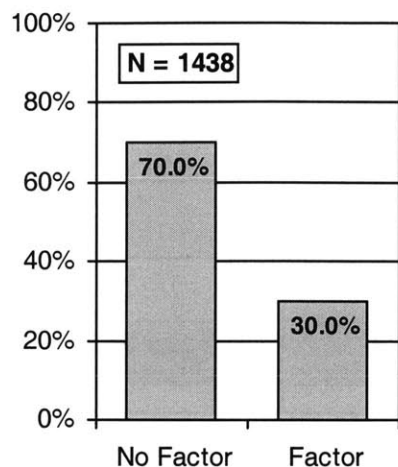


Figure B 60: Q13 – (Comfort) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

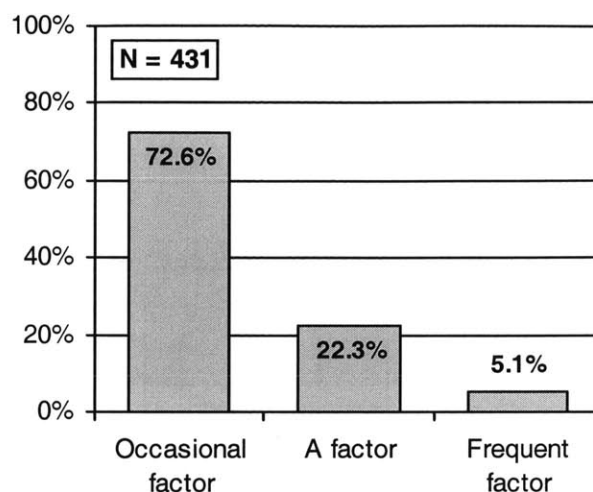


Figure B 61: Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

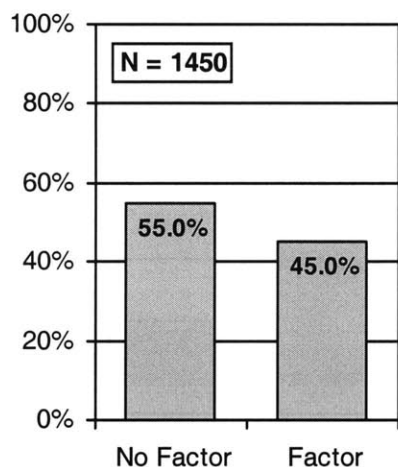


Figure B 62: Q13 – (Scheduling) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

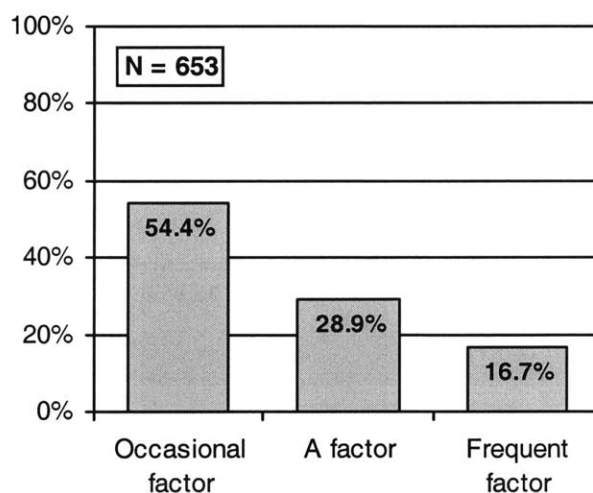


Figure B 63: Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

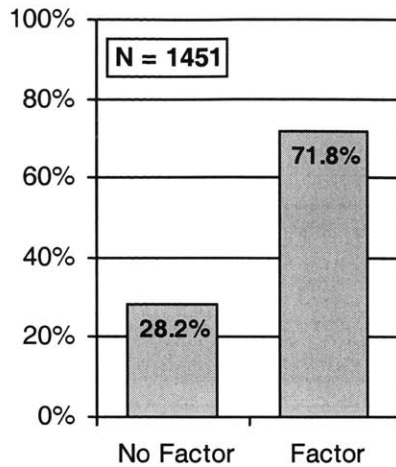


Figure B 64: Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

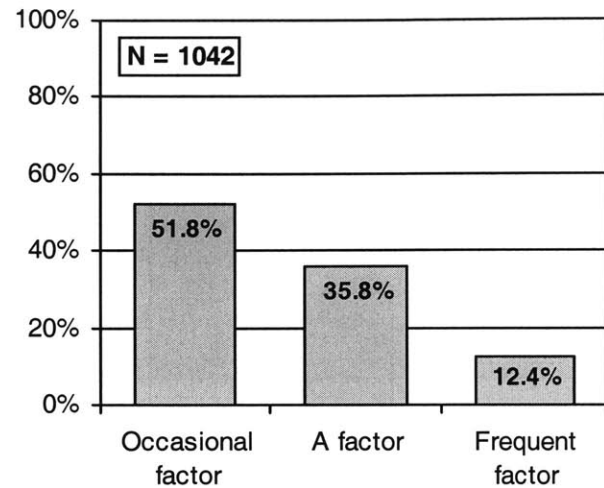


Figure B 65: Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

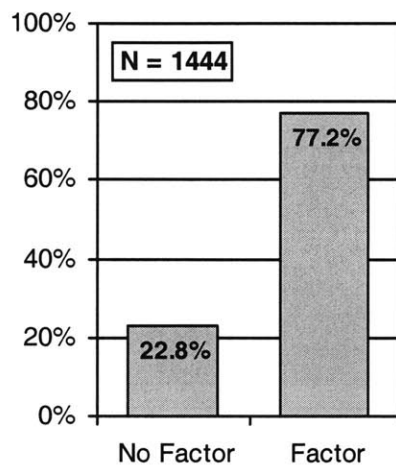


Figure B 66: Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

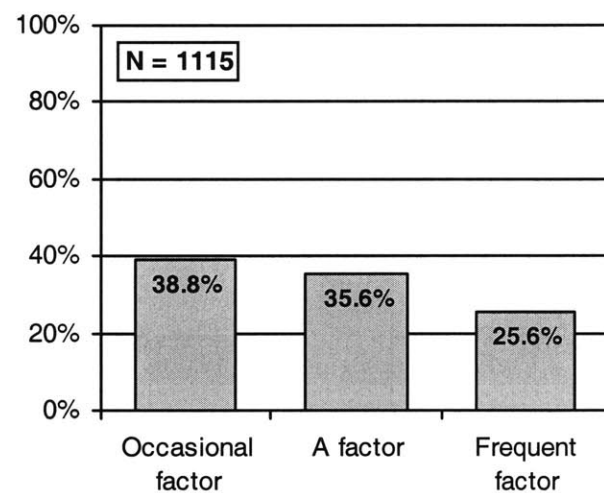


Figure B 67: Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

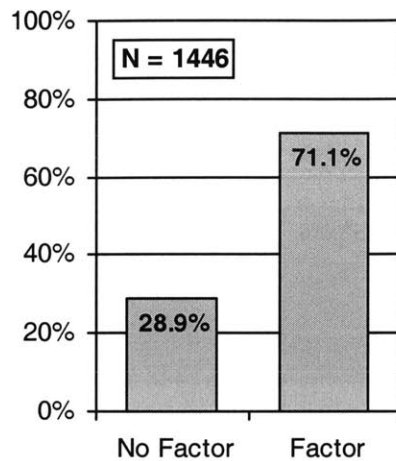


Figure B 68: Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

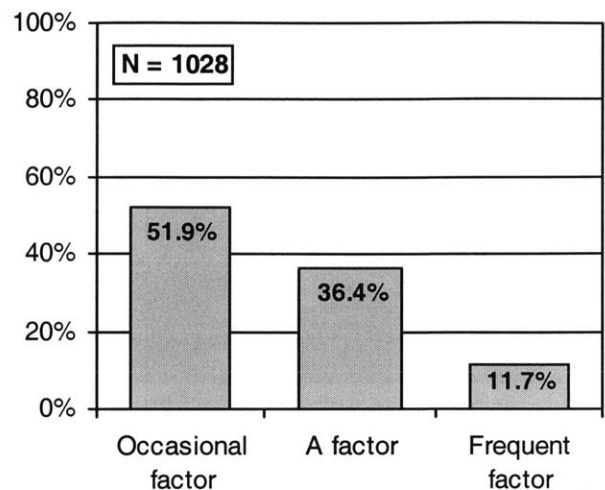


Figure B 69: Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

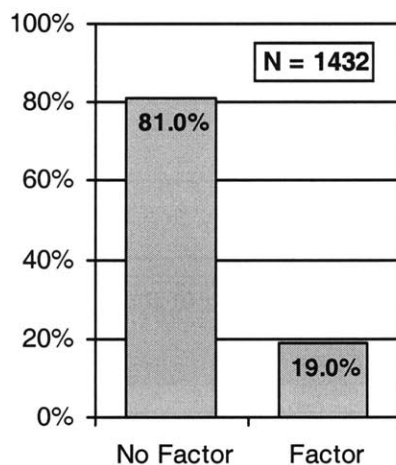


Figure B 70: Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

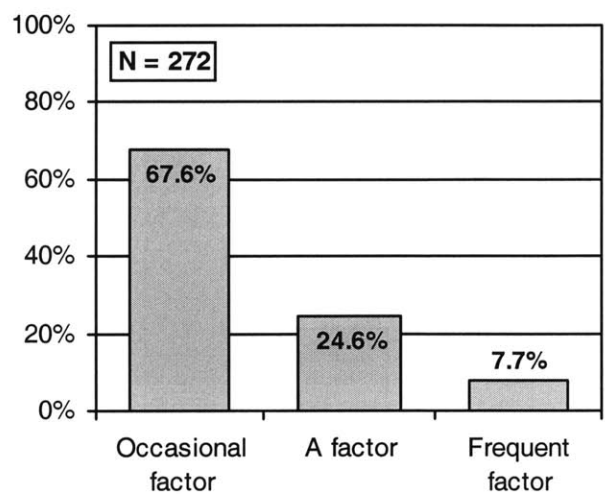


Figure B 71: Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

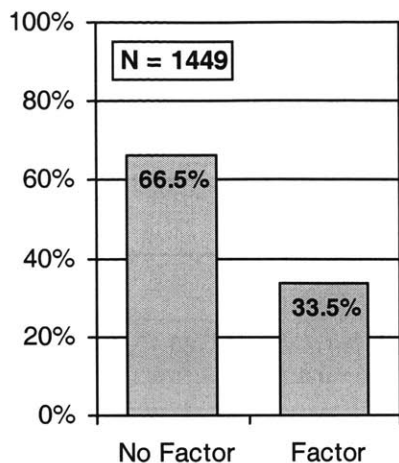


Figure B 72: Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

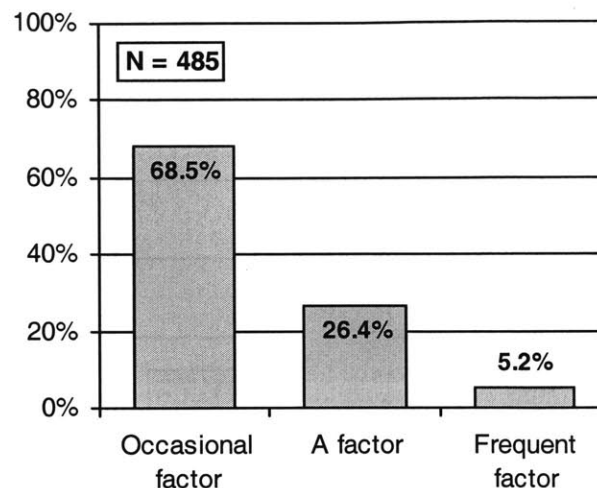


Figure B 73: Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

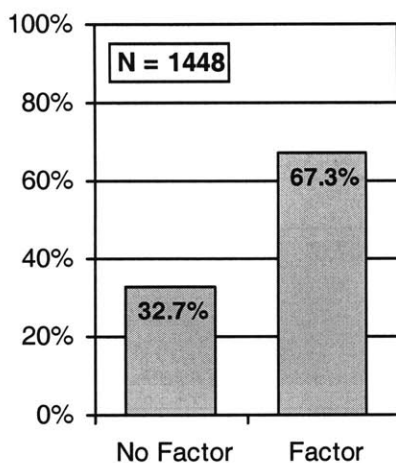


Figure B 74: Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

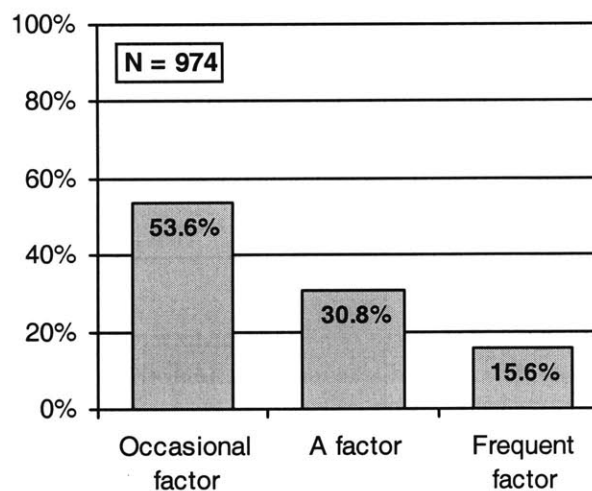


Figure B 75: Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

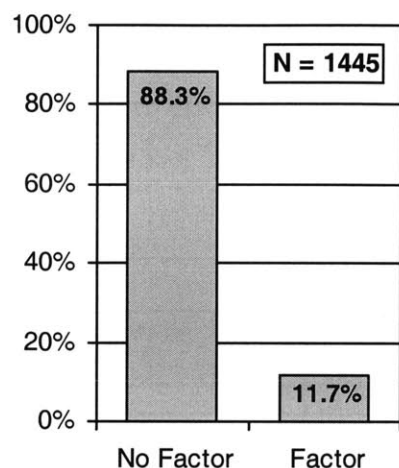


Figure B 76: Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

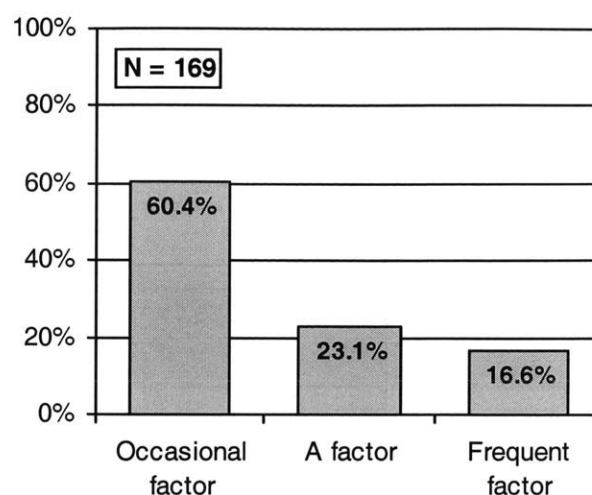


Figure B 77: Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

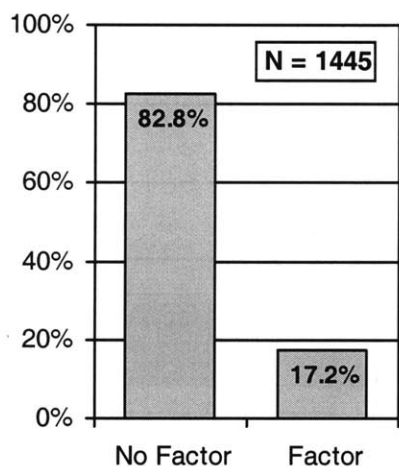


Figure B 78: Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

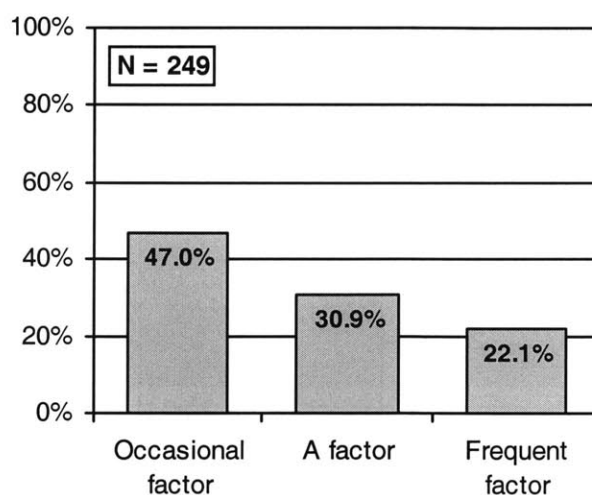


Figure B 79: Q13 – (Insurance Costs) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

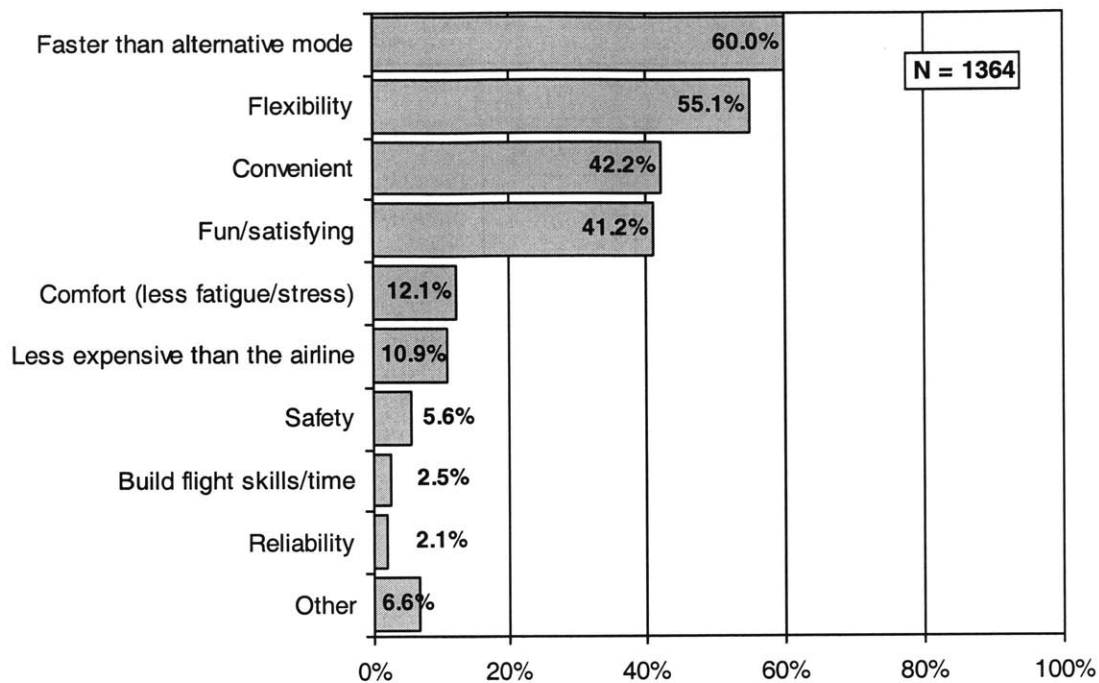


Figure B 80: Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

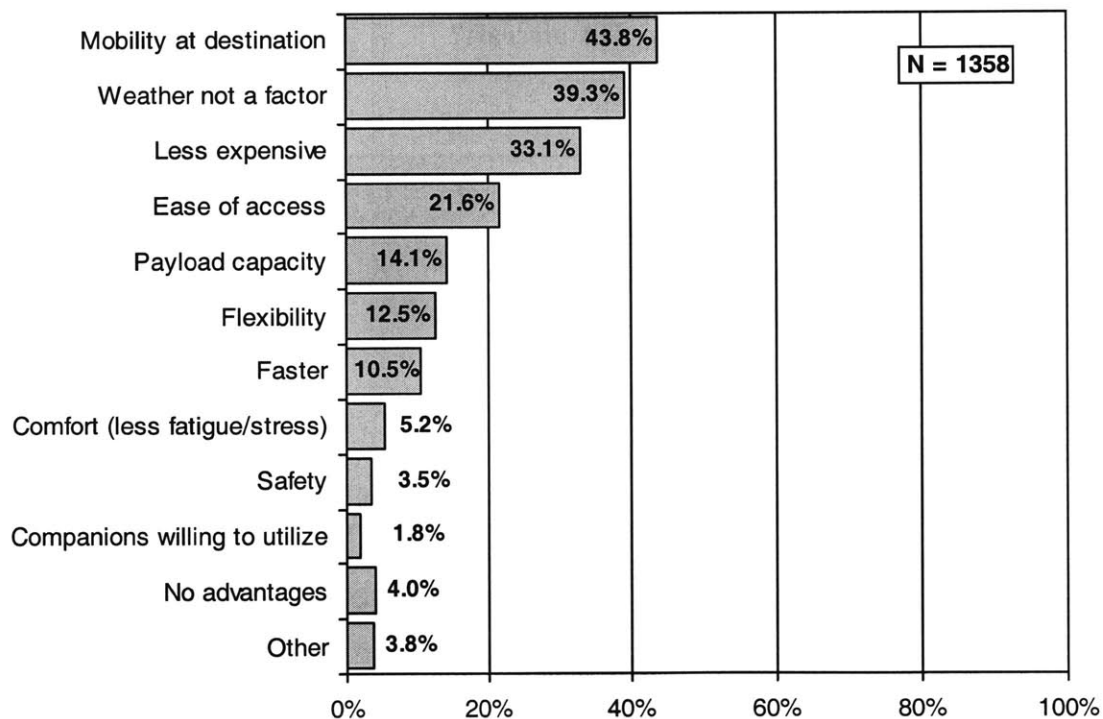


Figure B 81: Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

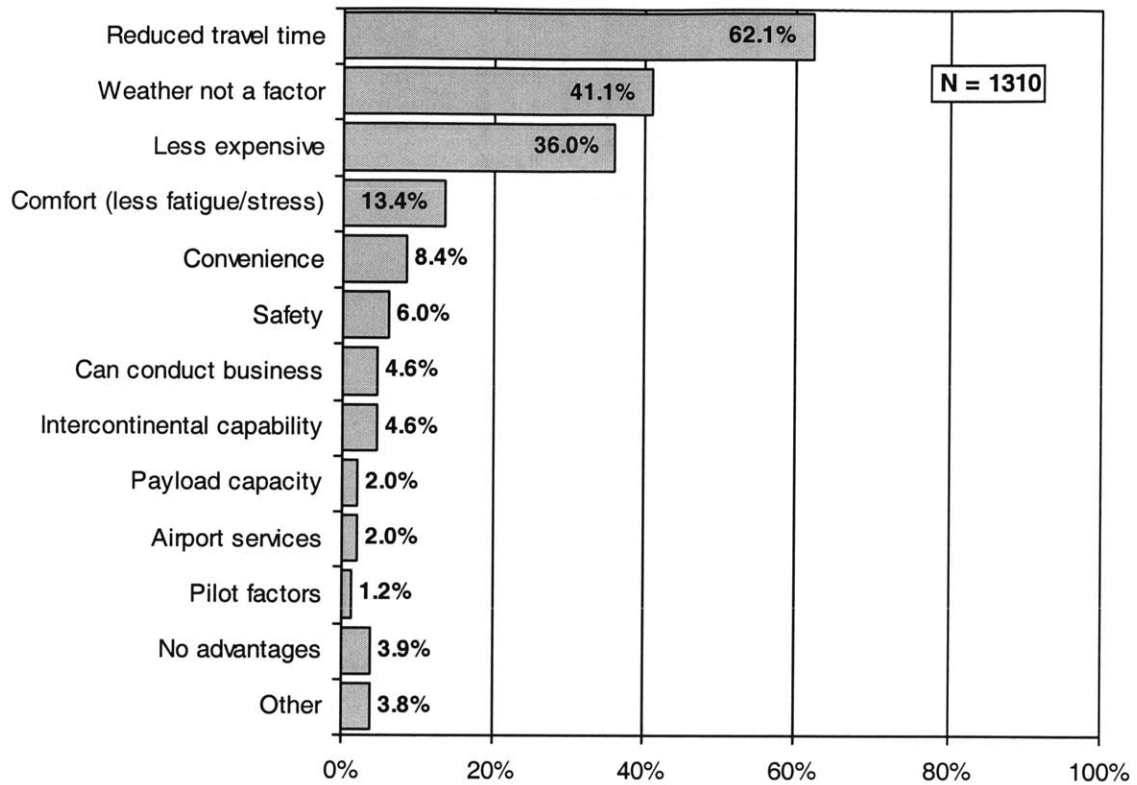


Figure B 82: Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

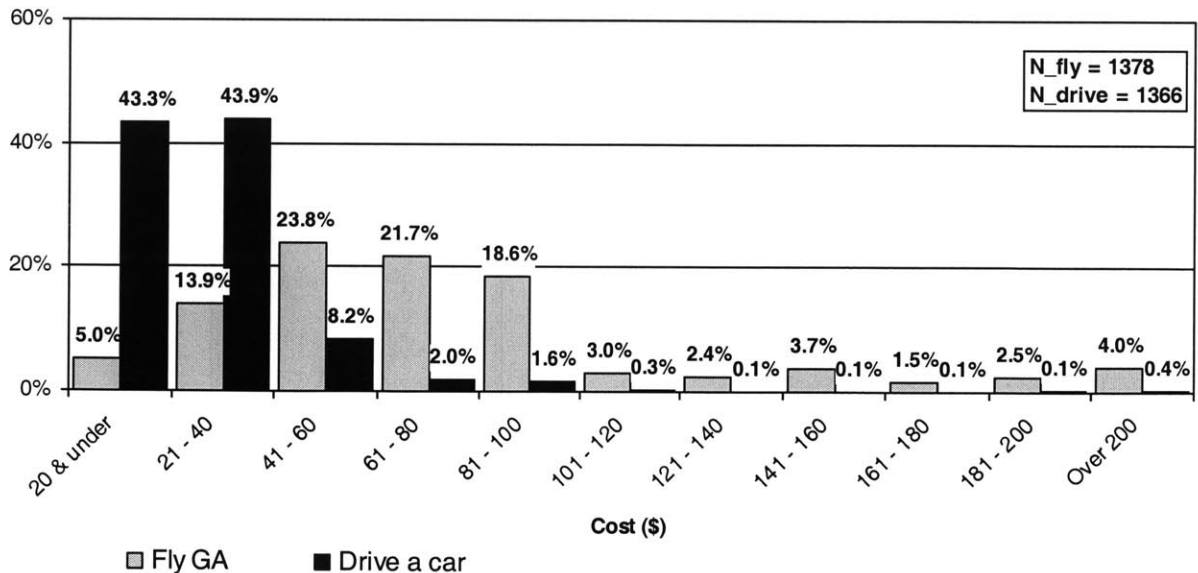


Figure B 83: Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

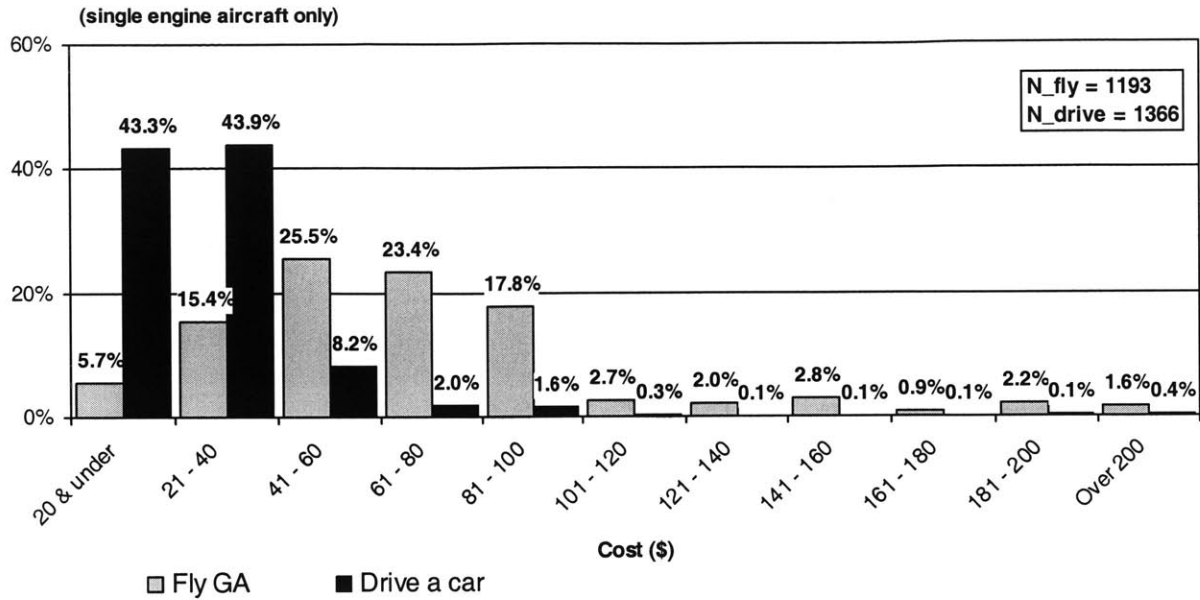


Figure B 84: Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

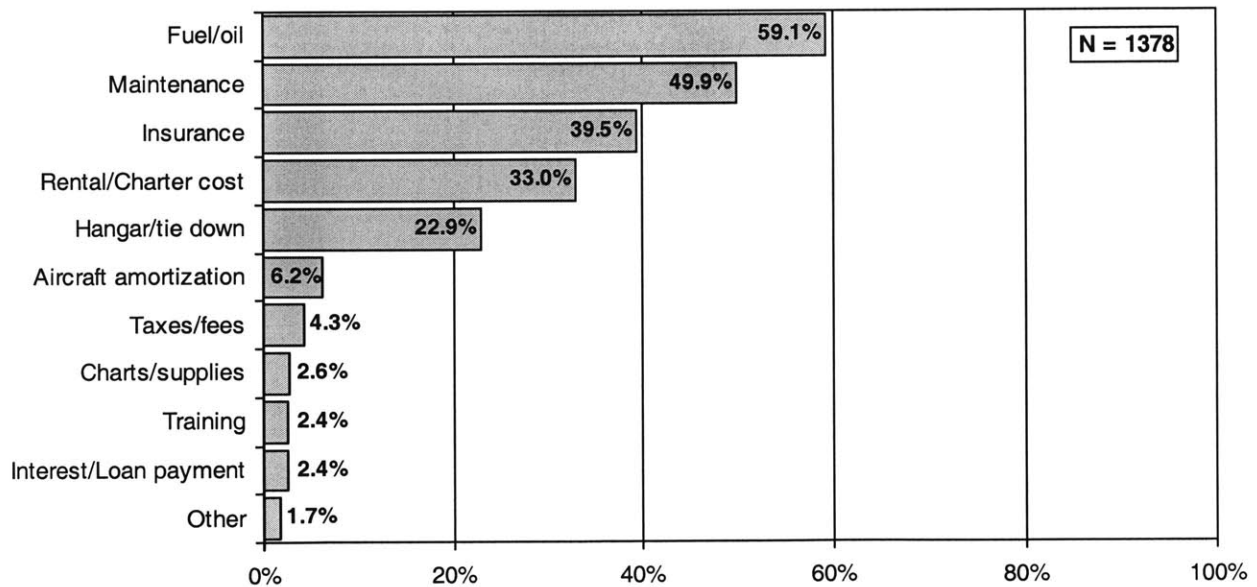


Figure B 85: Q17 - What items create this cost to fly 100 statute miles?

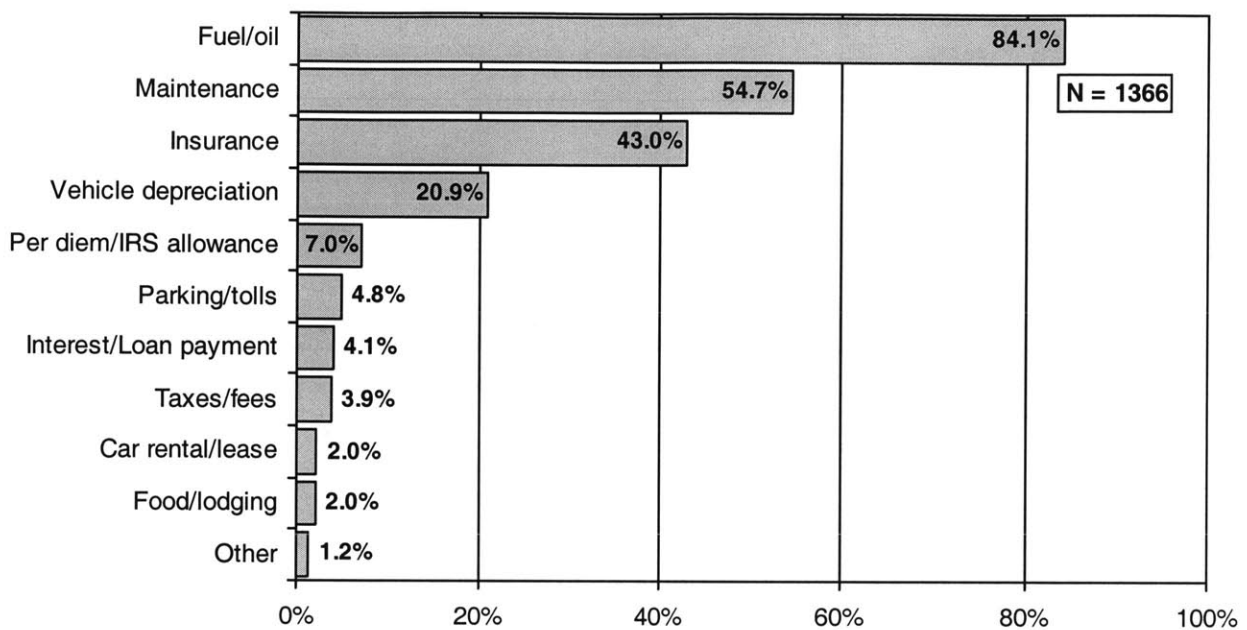


Figure B 86: Q18 - What items create this cost to drive a car 100 statute miles?

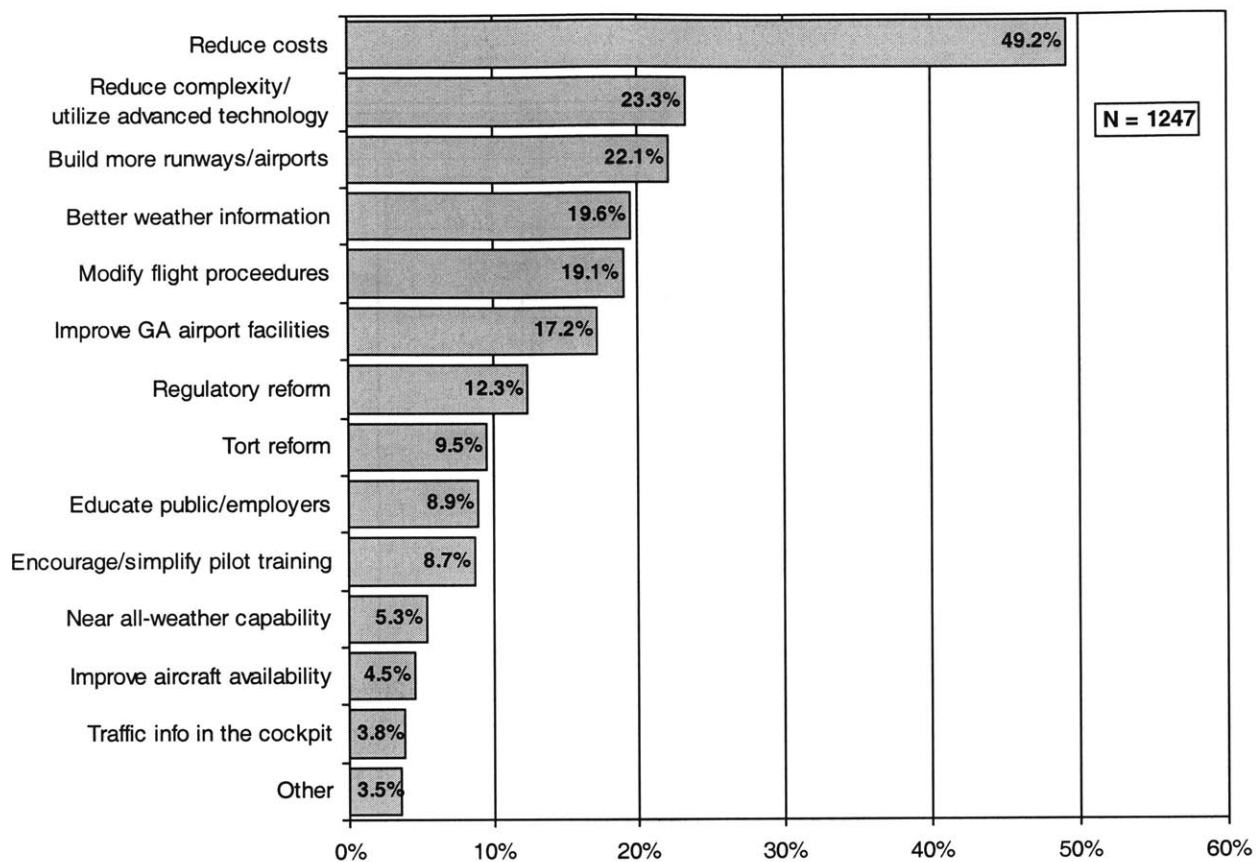


Figure B 87: Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

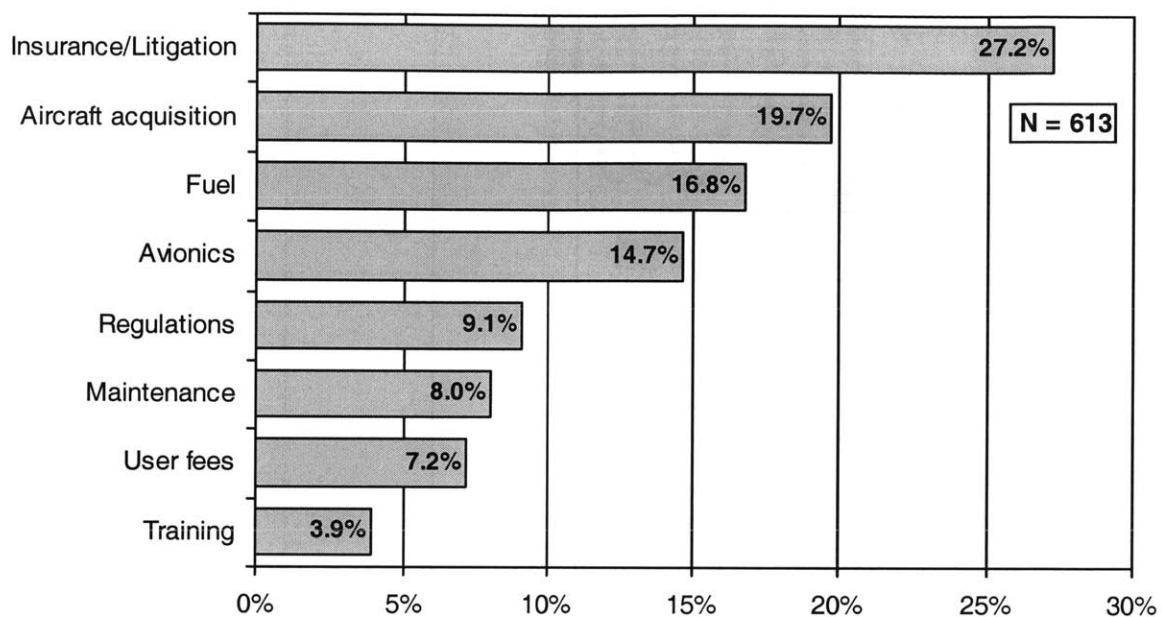


Figure B 88: Q19 - Specific Areas Cited For Cost Reduction

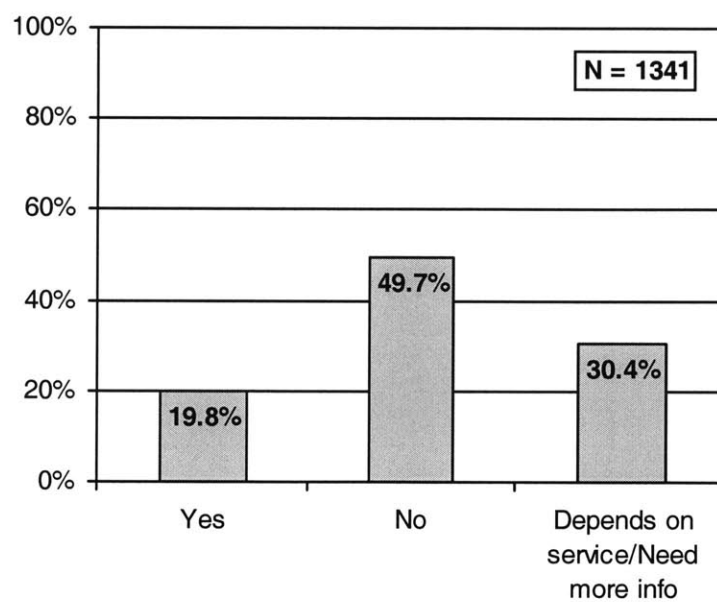


Figure B 89: Q20 - Would Those Surveyed Use a Proposed Dispatch Service

B3 SURVEY RESULTS: AIRCRAFT OWNERS

The figures in this section represent the data for only those who indicated in survey question 3 that they wholly owned their aircraft. There were 670 responses in this category. The data is presented in the order in which the questions were presented in the survey. See Appendix A for a complete copy of the survey.

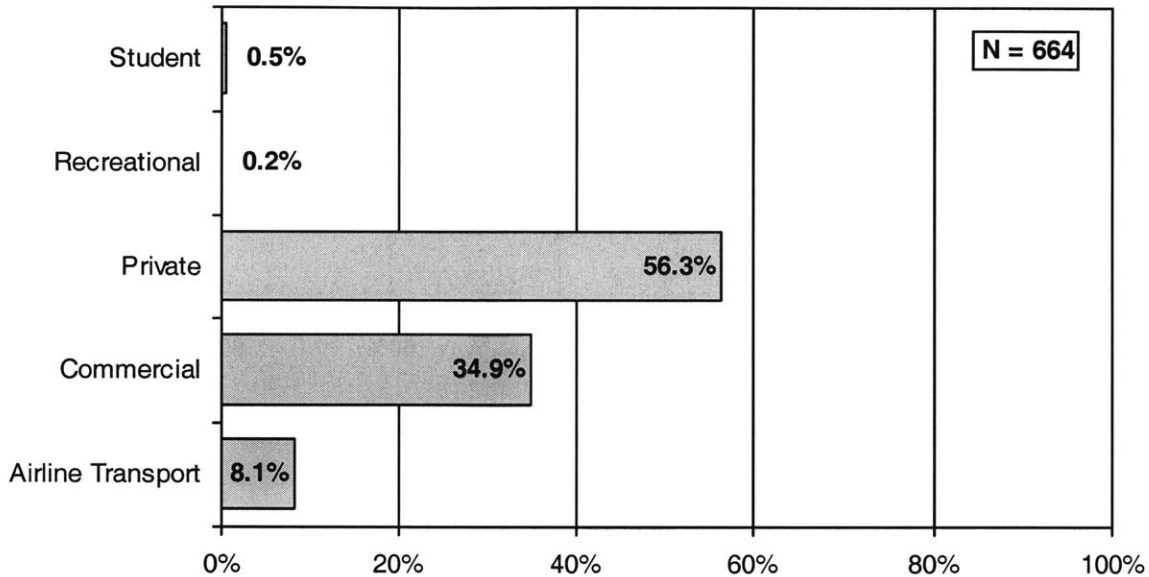


Figure B 90: (Owners) Survey Respondents' Pilot Certificate

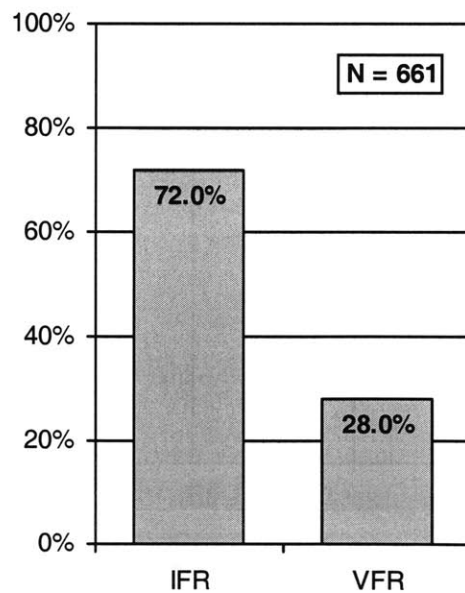


Figure B 91: (Owners) Survey Respondents' Instrument Rating

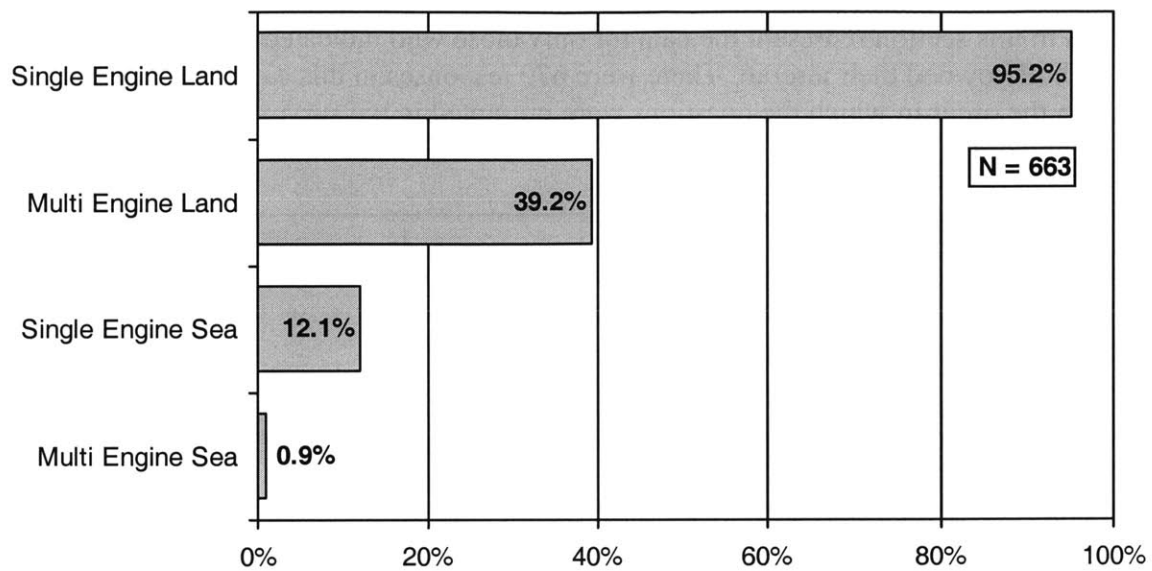


Figure B 92: (Owners) Survey Respondents' Airplane Class Rating

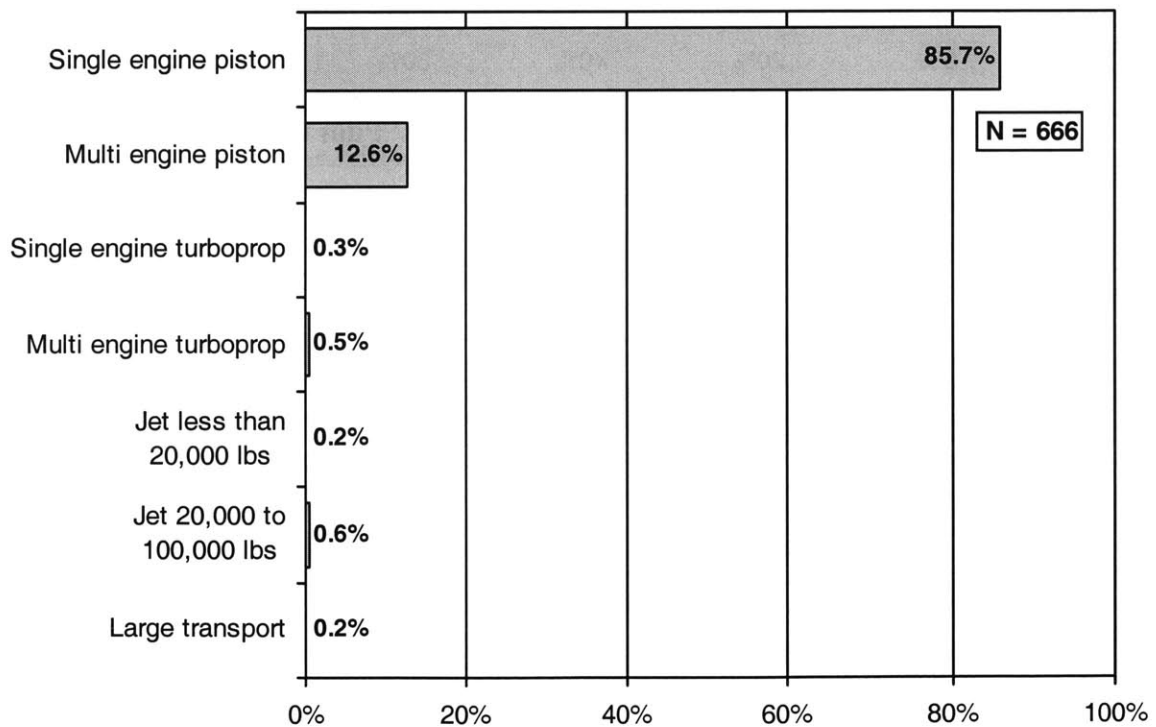


Figure B 93: (Owners) Survey Respondents' Current Airplane Type Considered for the Survey

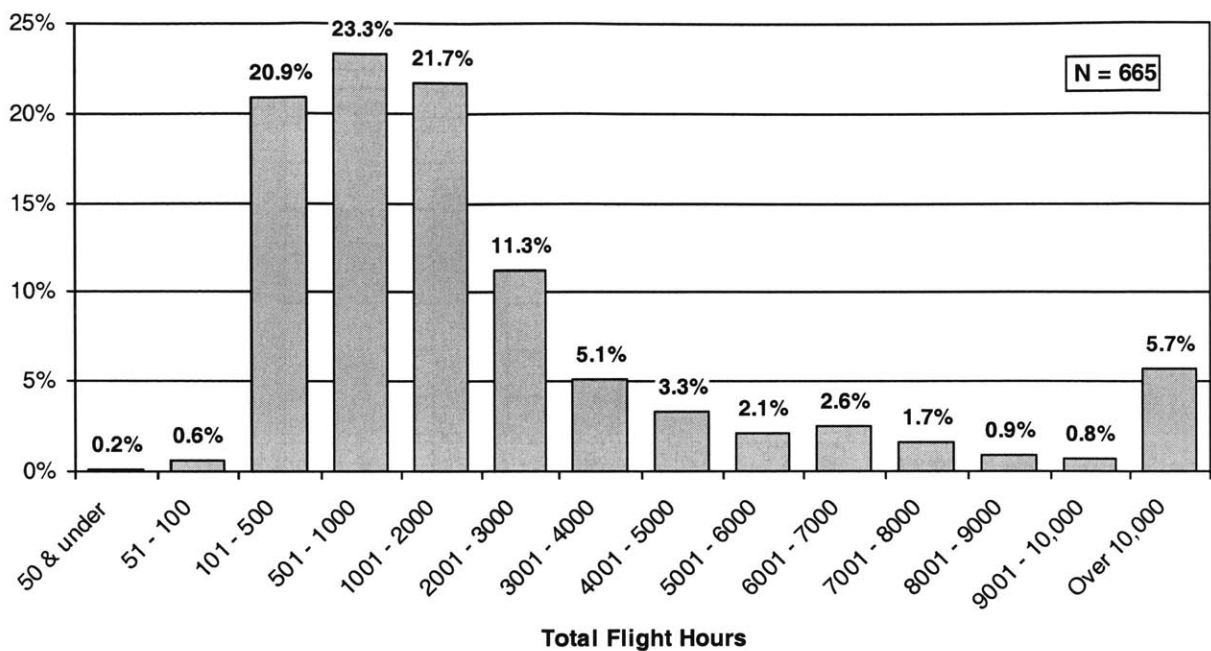


Figure B 94: (Owners) Survey Respondents' Total Flight Hours

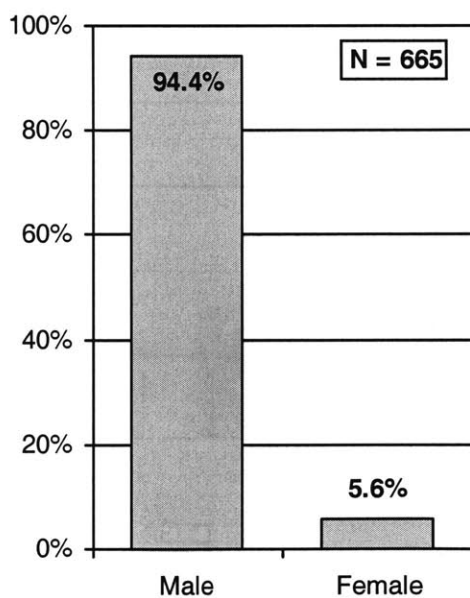


Figure B 95: (Owners) Survey Respondents' Gender

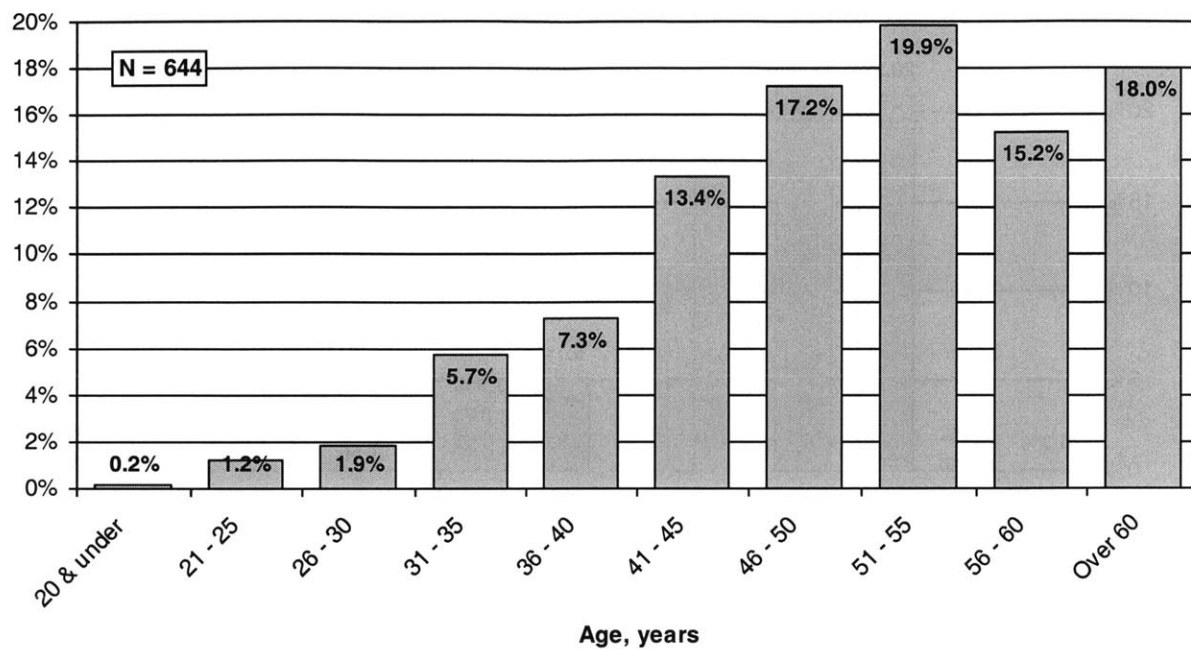


Figure B 96: (Owners) Survey Respondents' Age

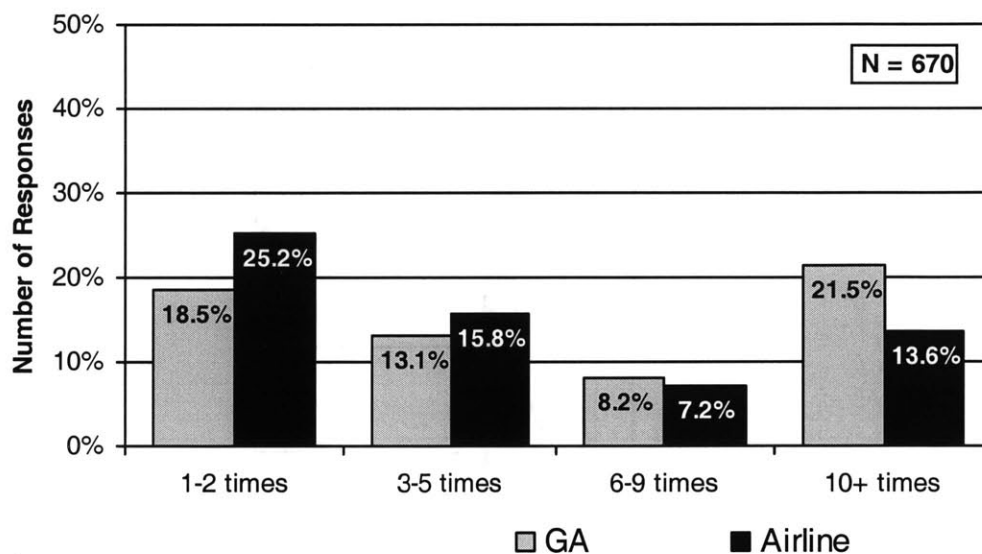


Figure B 97: (Owners) Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

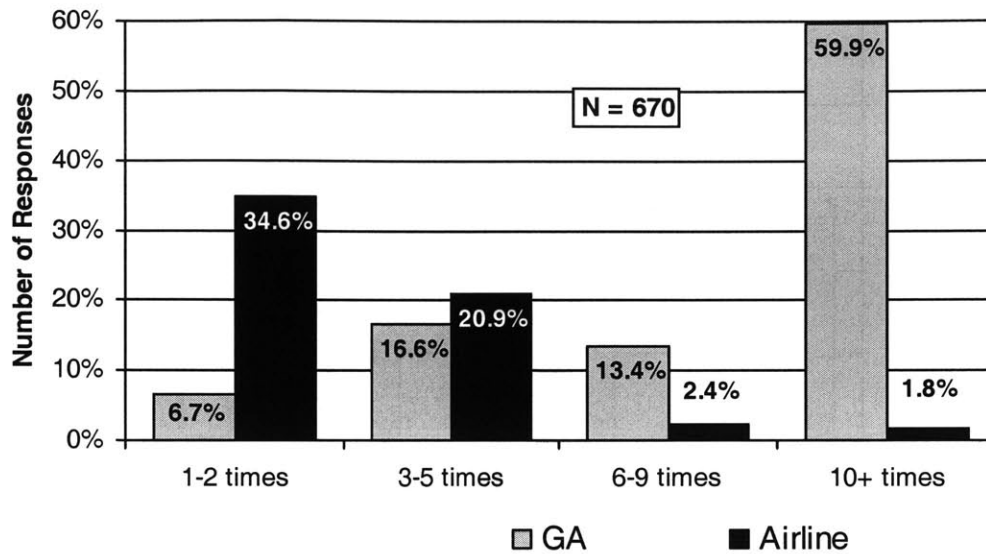


Figure B 98: (Owners) Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

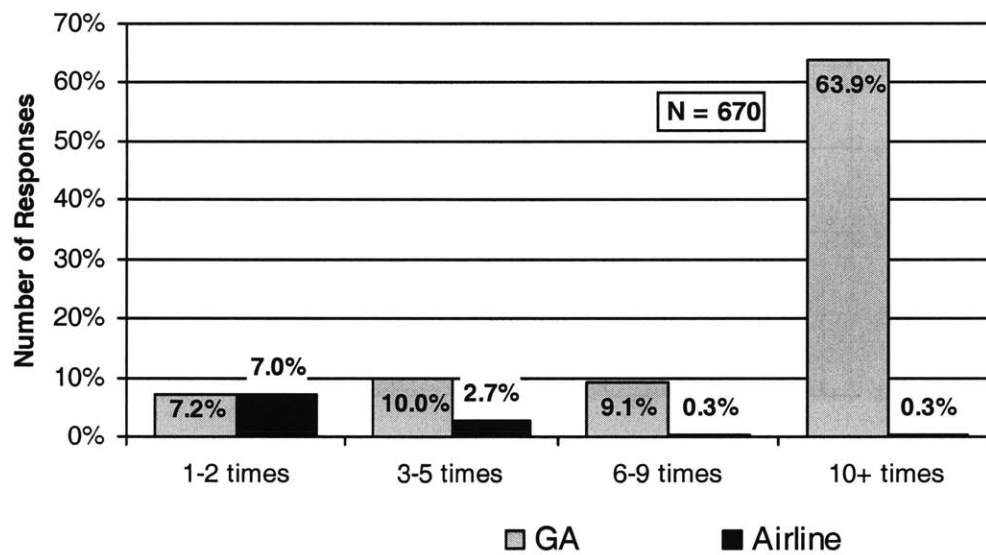


Figure B 99: (Owners) Q1 & Q2 - Trips Taken For Pure Recreation

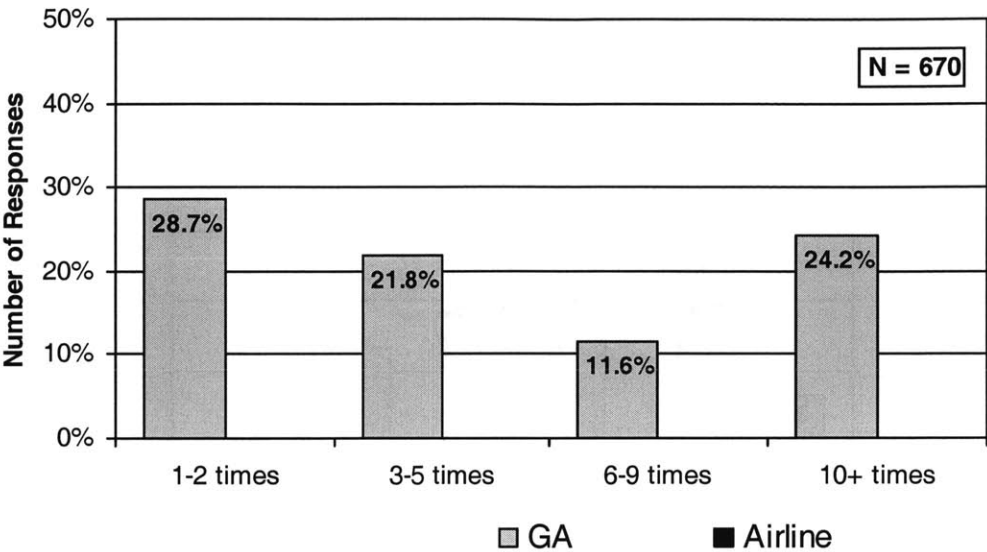


Figure B 100: (Owners) Q1 & Q2 - Trips Taken For Training

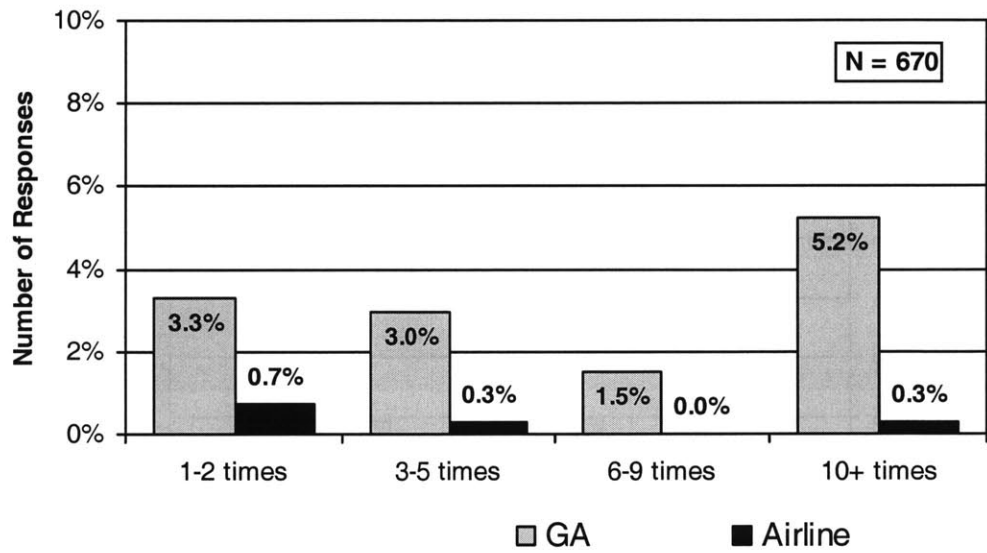


Figure B 101: (Owners) Q1 & Q2 - Trips Taken For Other Purposes

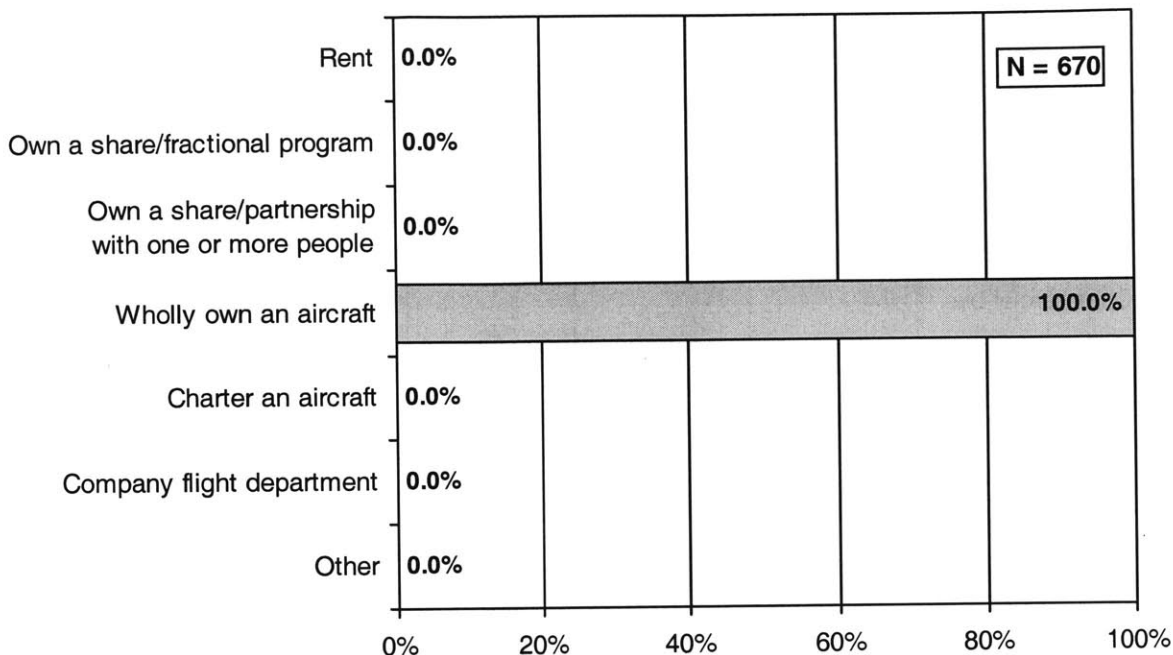


Figure B 102: (Owners) Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

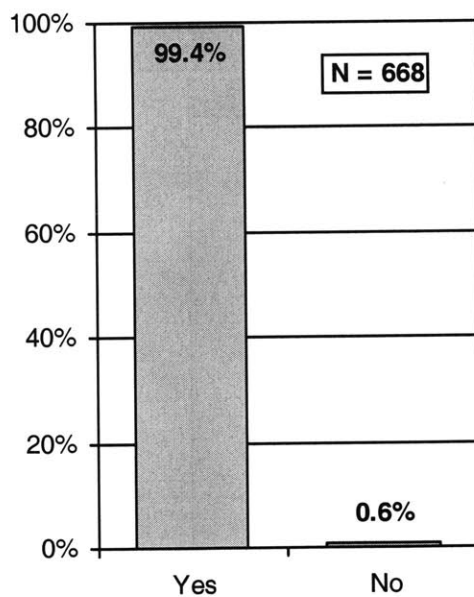


Figure B 103: (Owners) Q4 - When you fly on GA aircraft are you typically the pilot in command?

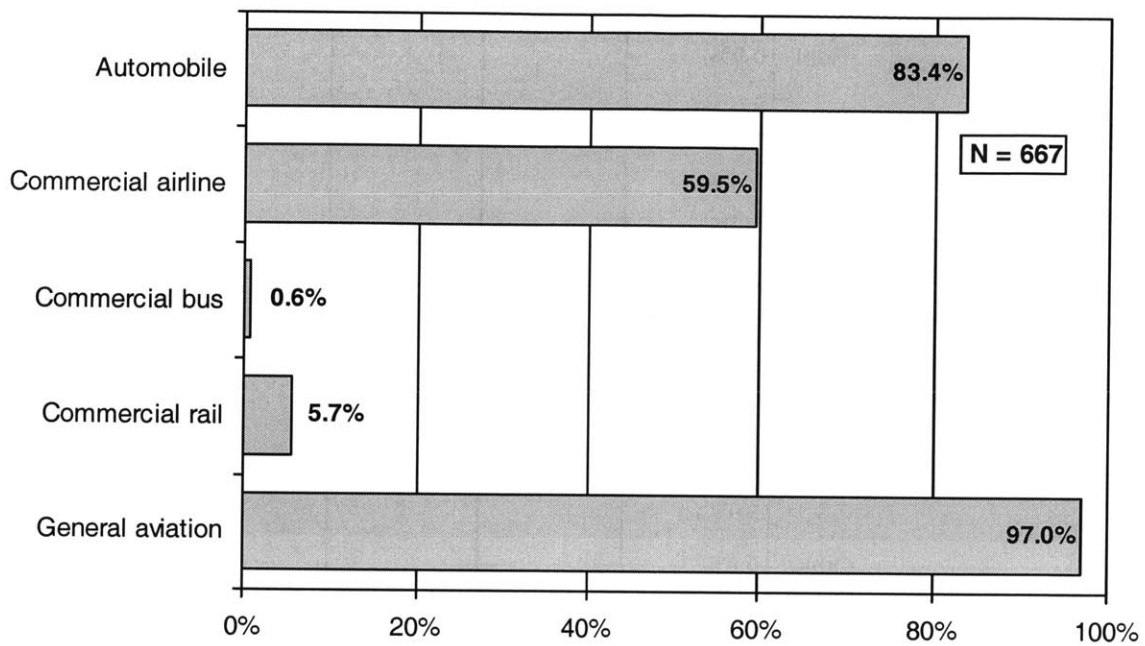


Figure B 104: (Owners) Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

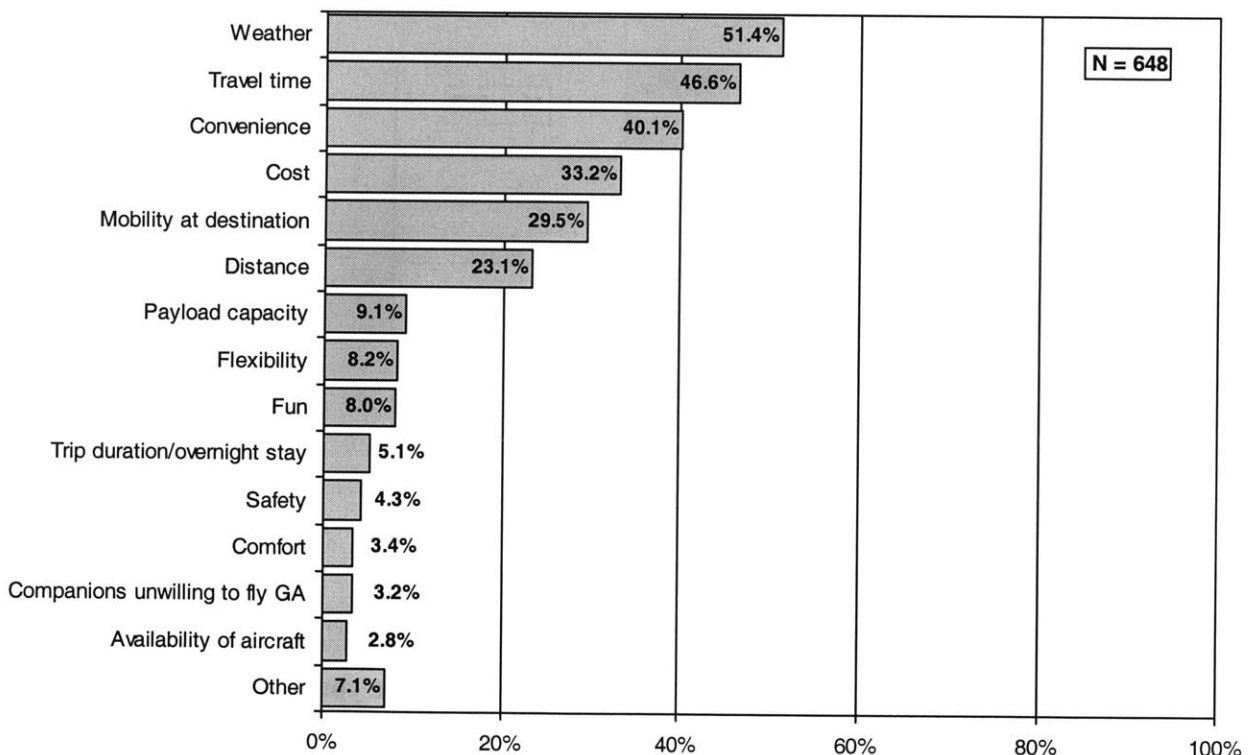


Figure B 105: (Owners) Q6 - What factors are your major considerations in choosing among the various modes of transportation?

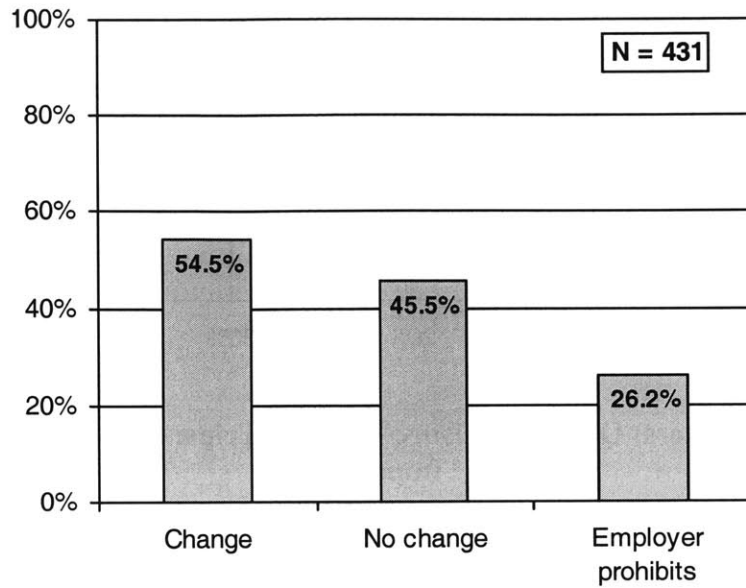


Figure B 106: (Owners) Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

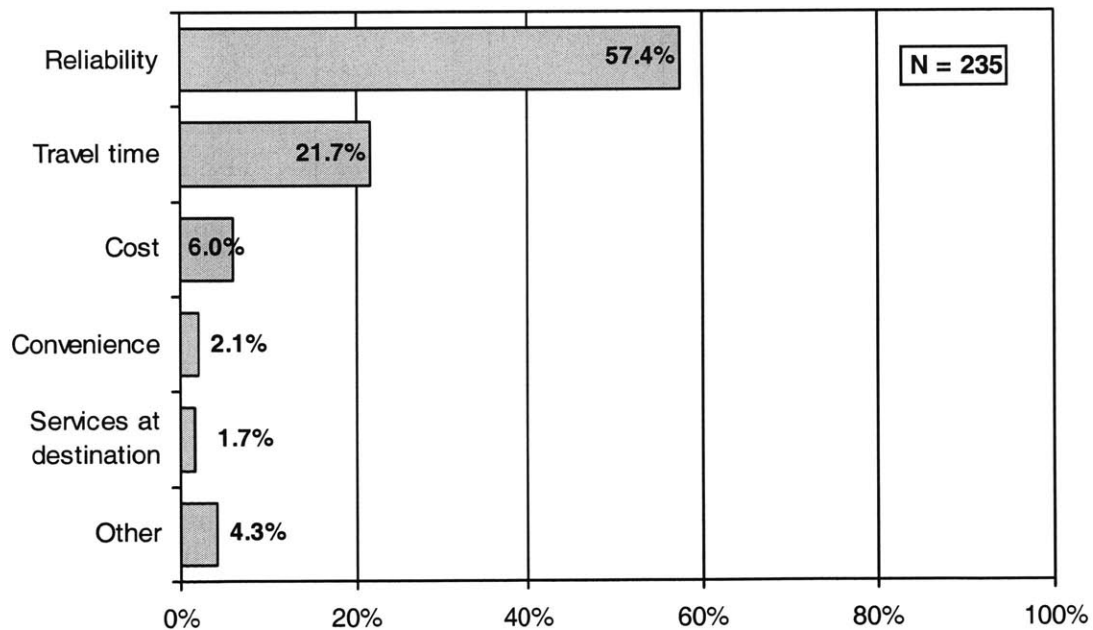


Figure B 107: (Owners) Q7 - For Business Trips: Factors That Become More Important

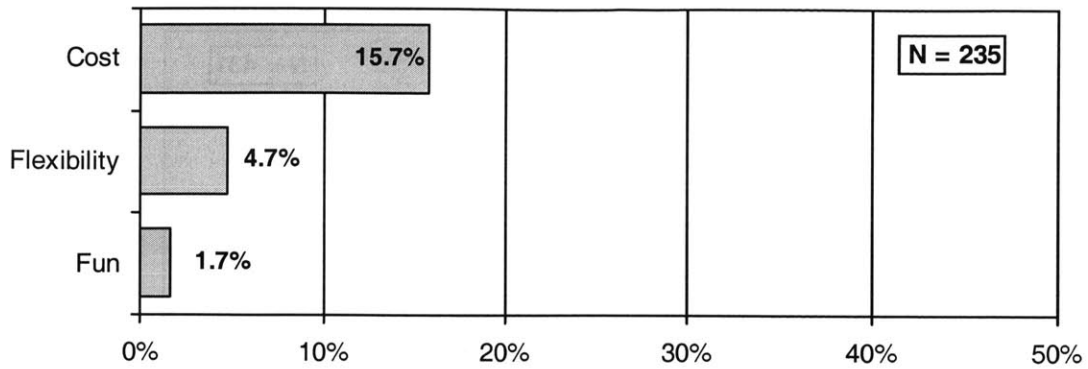


Figure B 108: (Owners) Q7 - For Leisure/Personal Trips: Factors That Become More Important

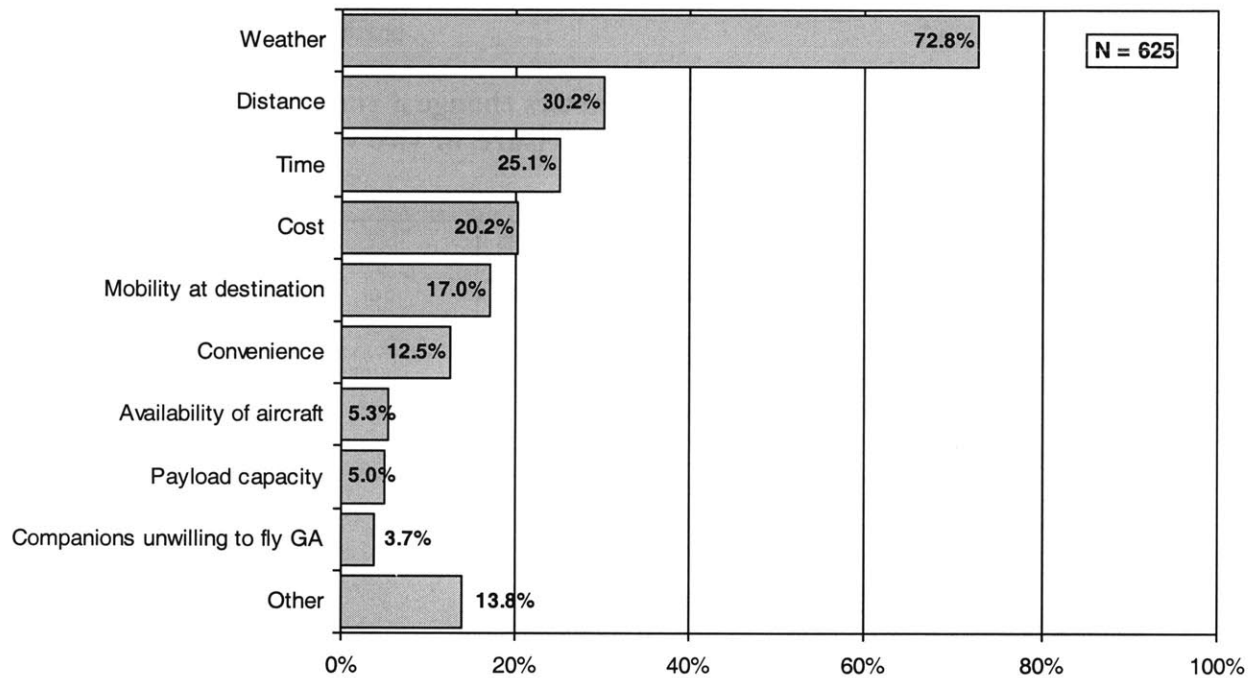


Figure B 109: (Owners) Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

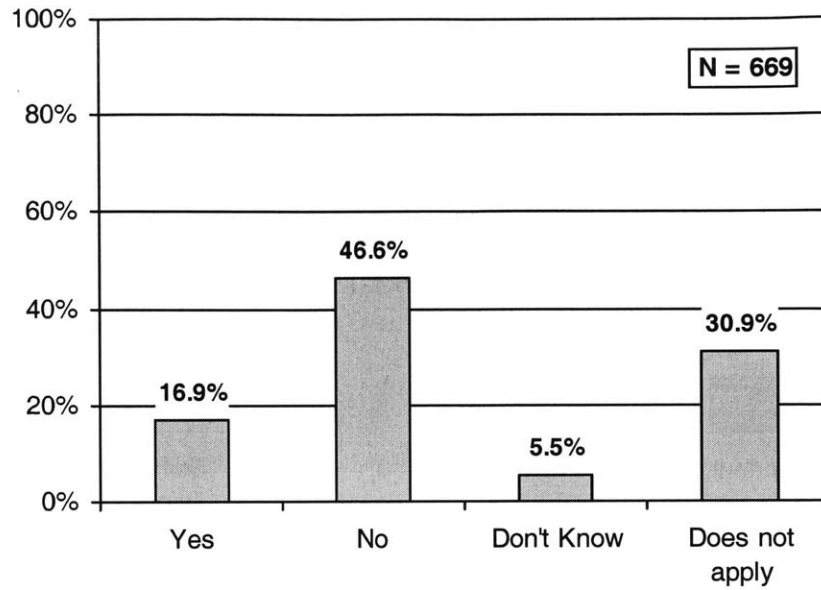


Figure B 110: (Owners) Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

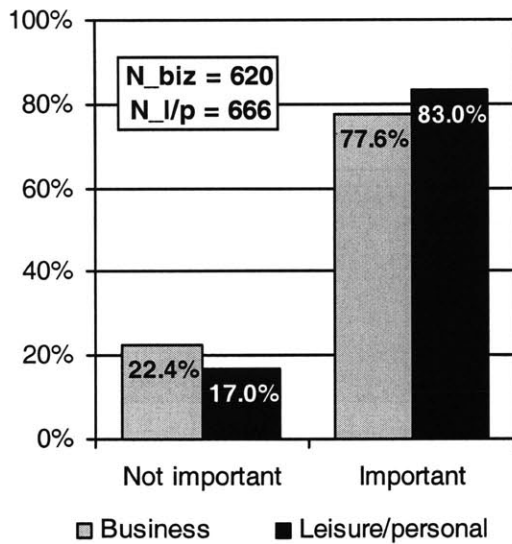


Figure B 111: (Owners) Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

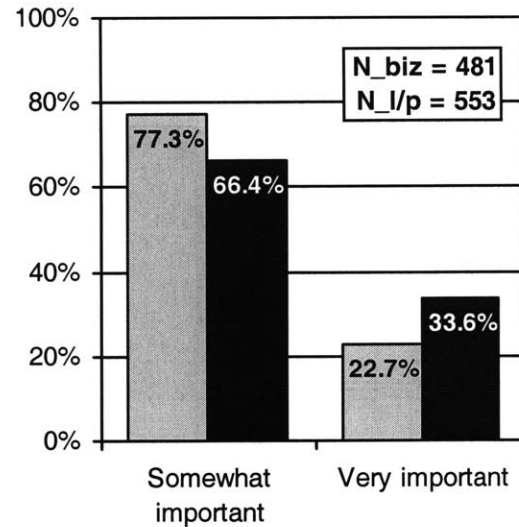


Figure B 112: (Owners) Q10 – (Expense) Of those who rated the issue "important," the degree to which they considered it important

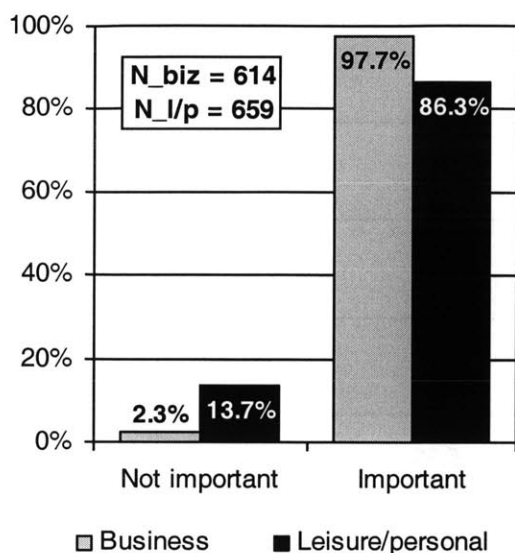


Figure B 113: (Owners) Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

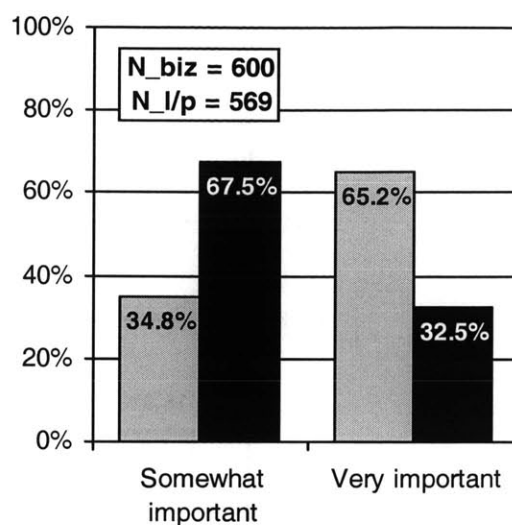


Figure B 114: (Owners) Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

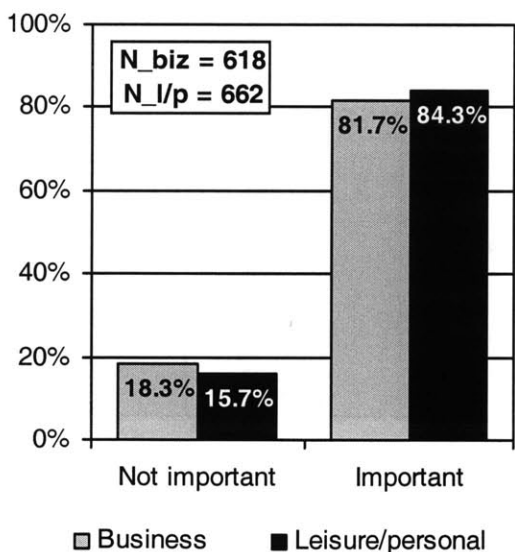


Figure B 115: (Owners) Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

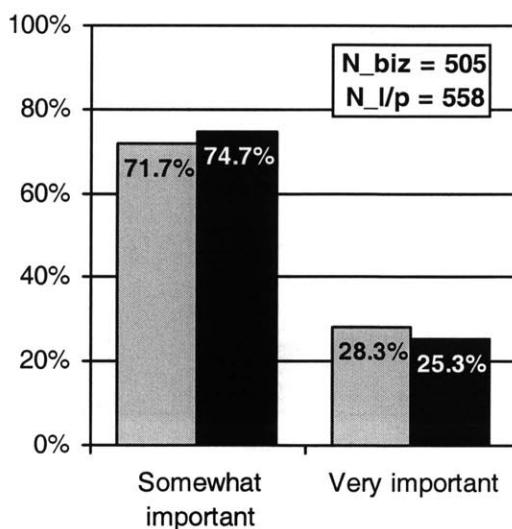


Figure B 116: (Owners) Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

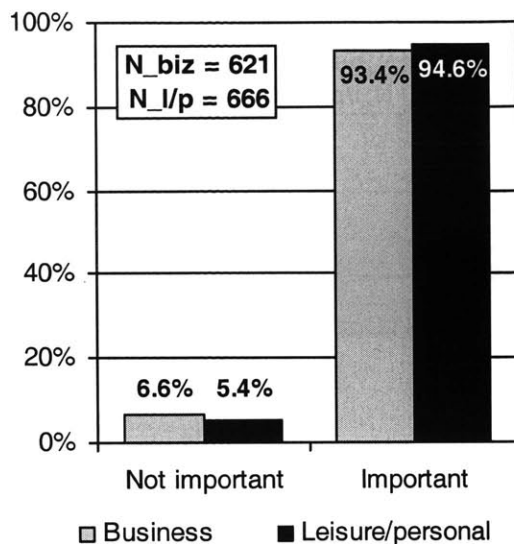


Figure B 117: (Owners) Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

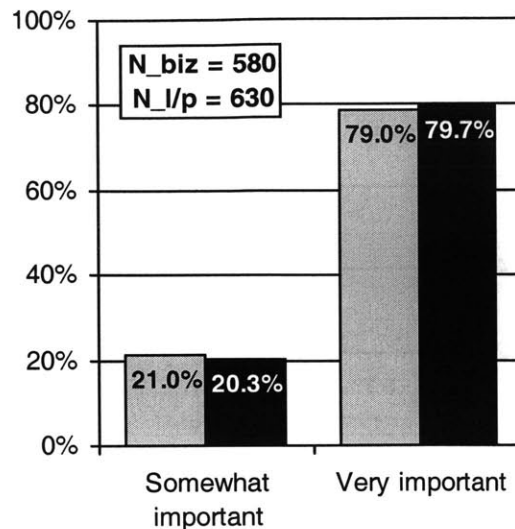


Figure B 118: (Owners) Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

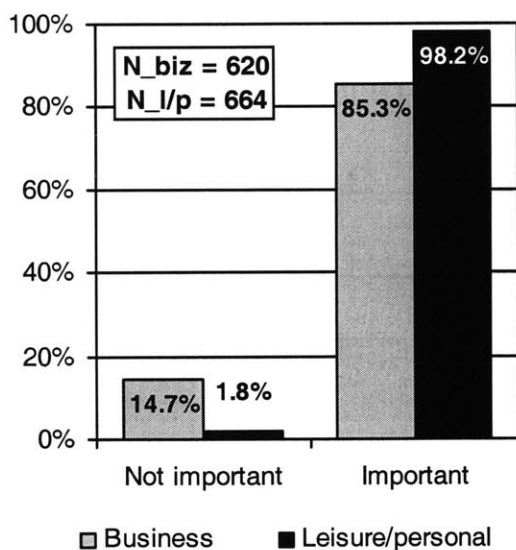


Figure B 119: (Owners) Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

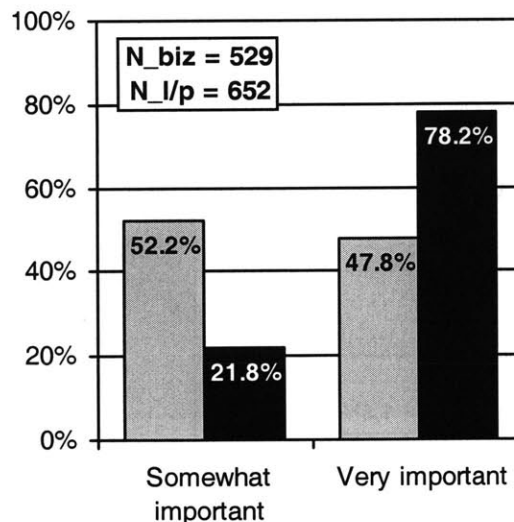


Figure B 120: (Owners) Q10 – (Fun) Of those who rated the issue “important,” the degree to which they considered it important

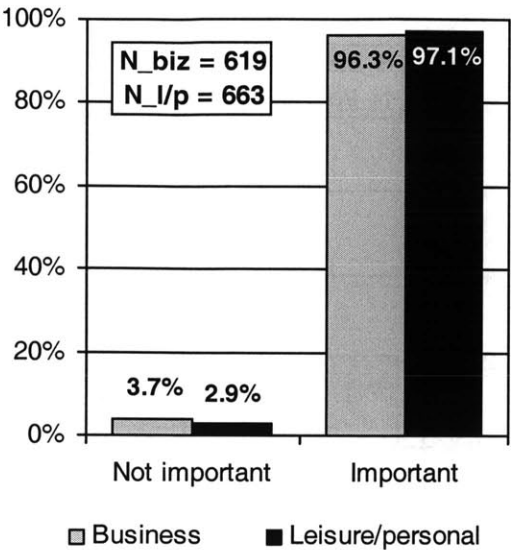


Figure B 121: (Owners) Q10 – (Flexibility)
How important to you are the following
issues in choosing your mode of travel?

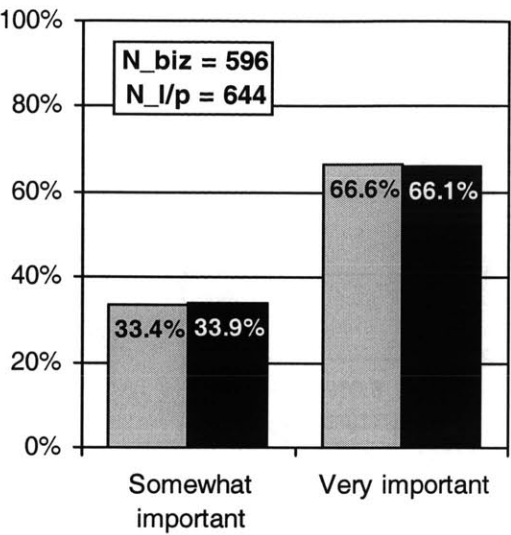


Figure B 122: (Owners) Q10 – (Flexibility)
Of those who rated the issue “important,”
the degree to which they considered it
important

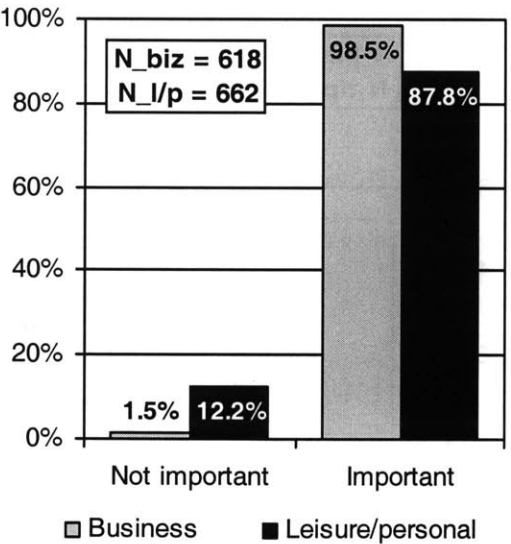


Figure B 123: (Owners) Q10 – (Reliability)
How important to you are the following
issues in choosing your mode of travel?

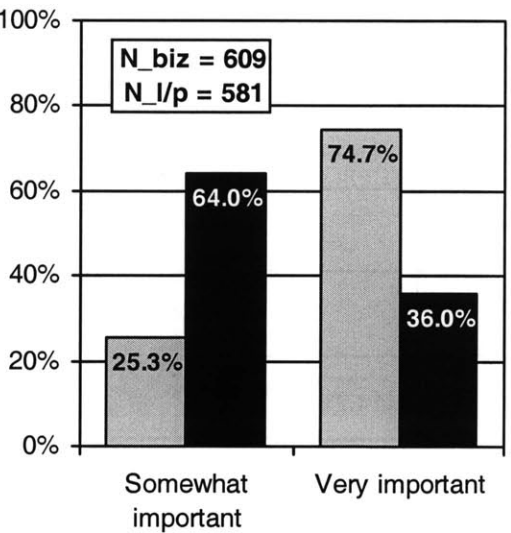


Figure B 124: (Owners) Q10 – (Reliability)
Of those who rated the issue “important,”
the degree to which they considered it
important

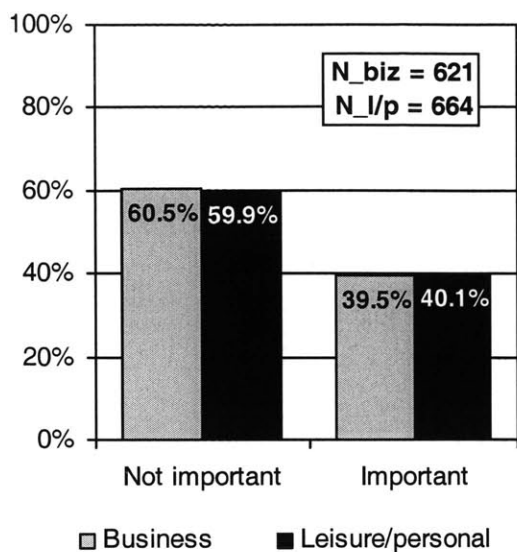


Figure B 125: (Owners) Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

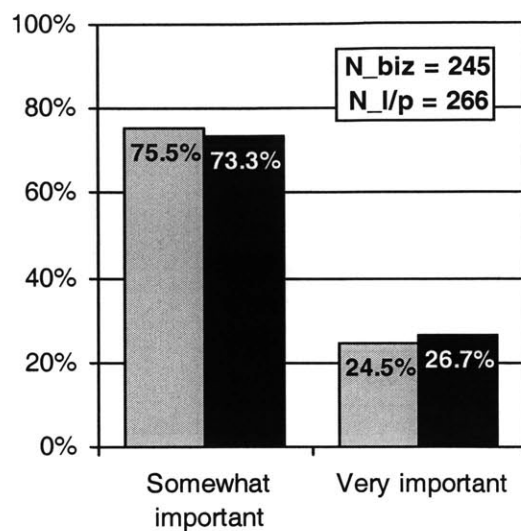


Figure B 126: (Owners) Q10 – (Privacy) Of those who rated the issue "important," the degree to which they considered it important

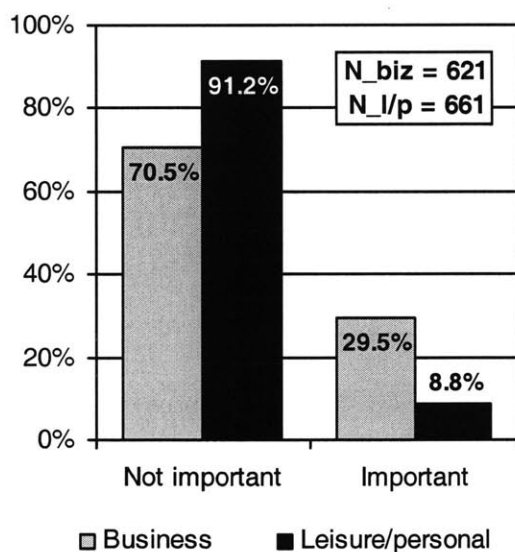


Figure B 127: (Owners) Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

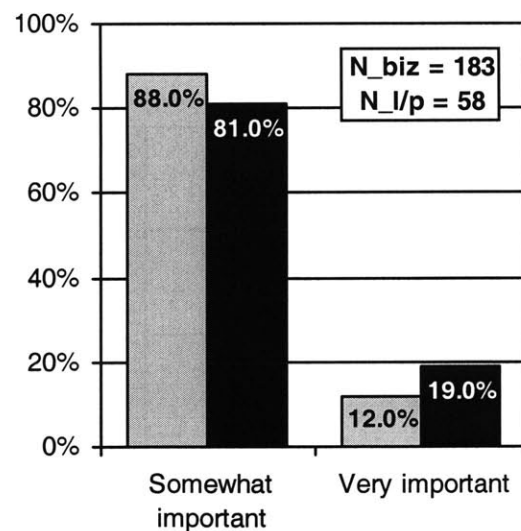


Figure B 128: (Owners) Q10 – (Conduct Business) Of those who rated the issue "important," the degree to which they considered it important

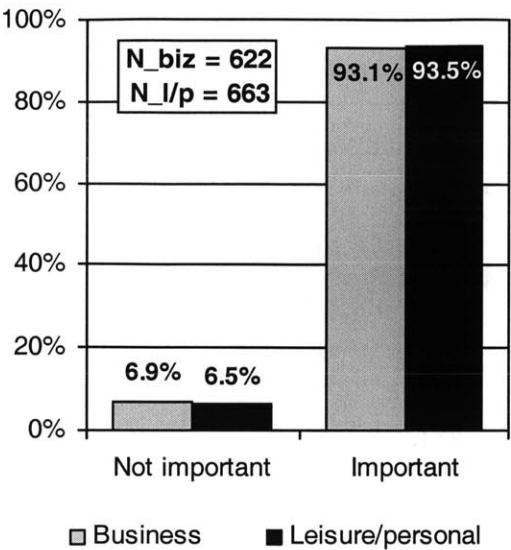


Figure B 129: (Owners) Q10 – (Mobility)
How important to you are the following
issues in choosing your mode of travel?

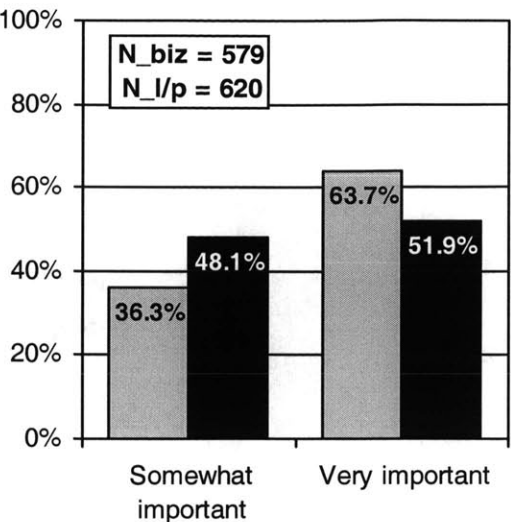


Figure B 130: (Owners) Q10 – (Mobility) Of
those who rated the issue “important,” the
degree to which they considered it
important

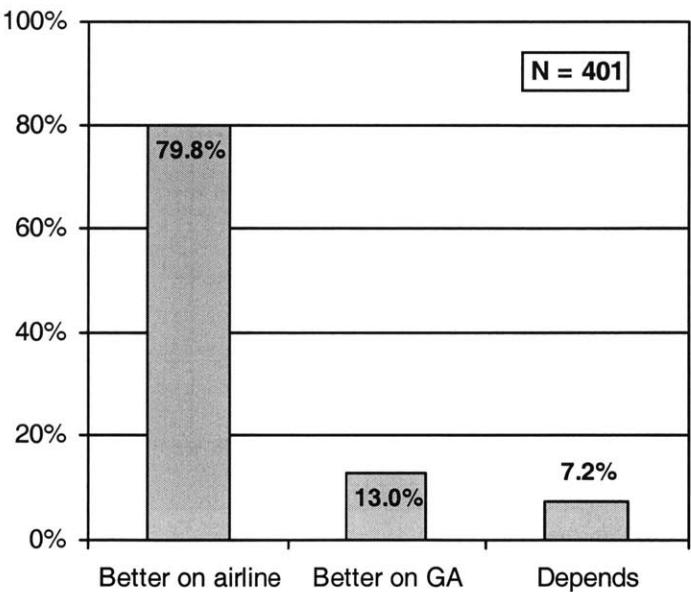


Figure B 131: (Owners) Q11 - Is your ability to conduct business or work while traveling
better on an airline than on a GA aircraft?

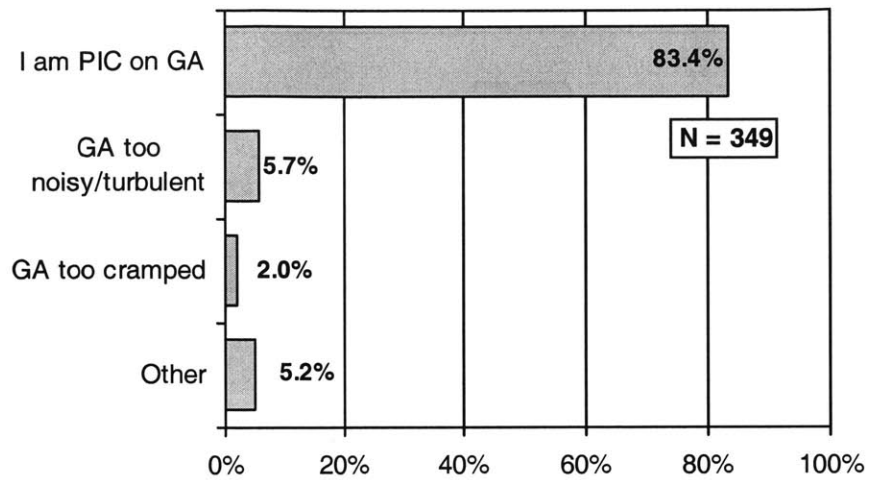


Figure B 132: (Owners) Q11 - Ability to work is better on airline because...

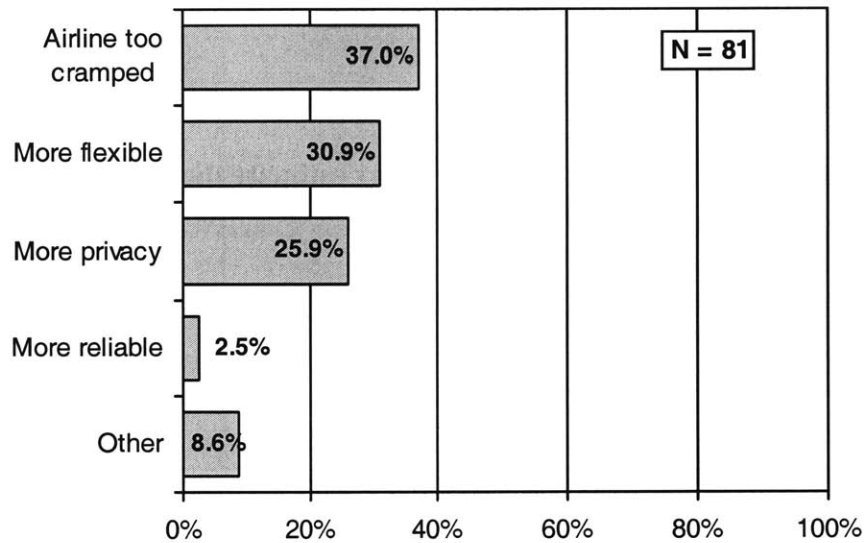


Figure B 133: (Owners) Q11 - Ability to work is better on GA because...

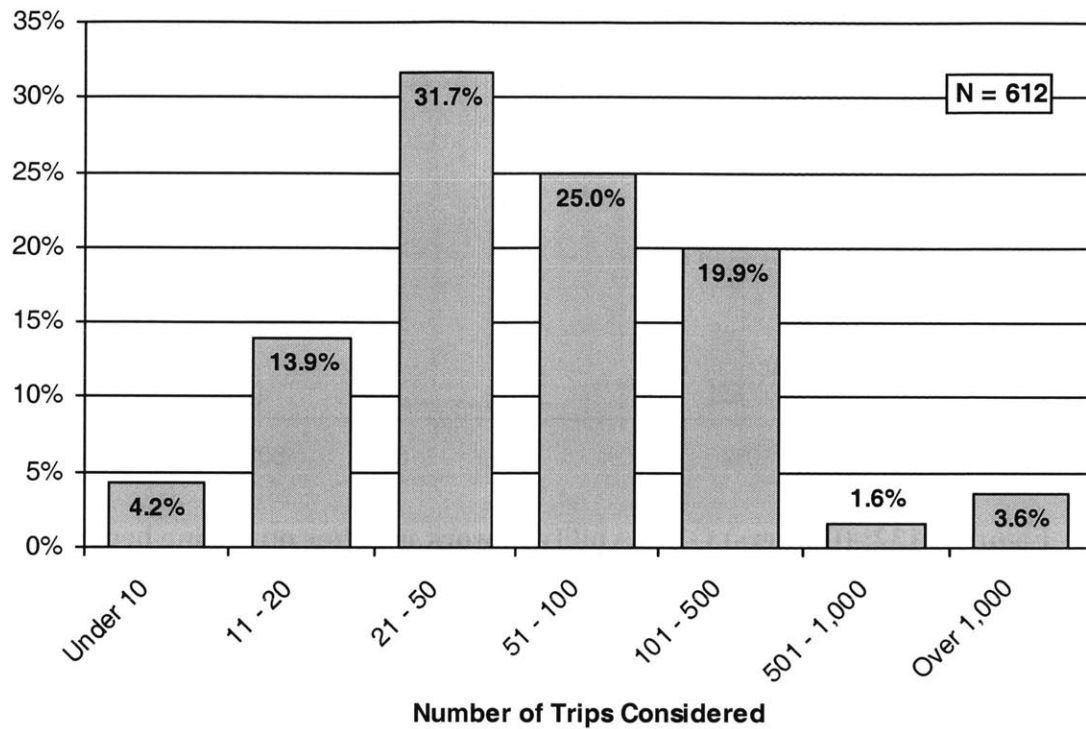


Figure B 134: (Owners) Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

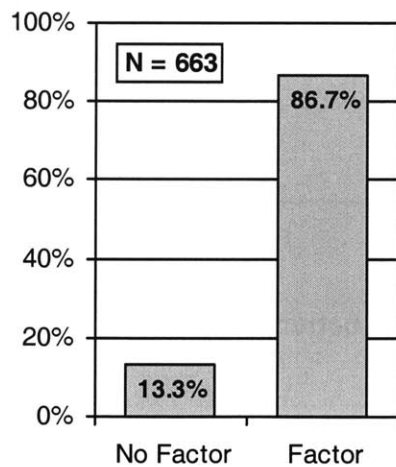


Figure B 135: (Owners) Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

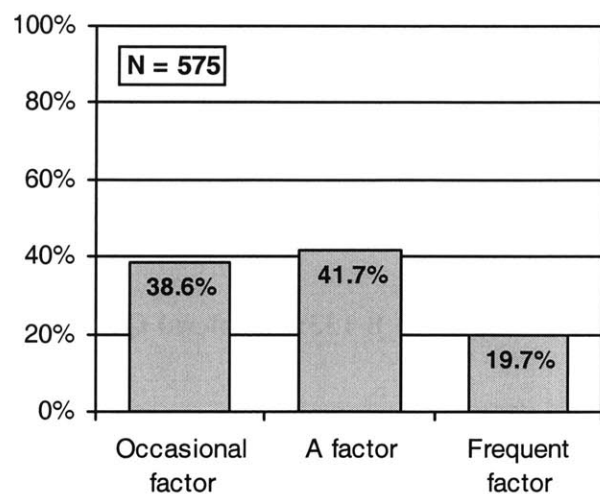


Figure B 136: (Owners) Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

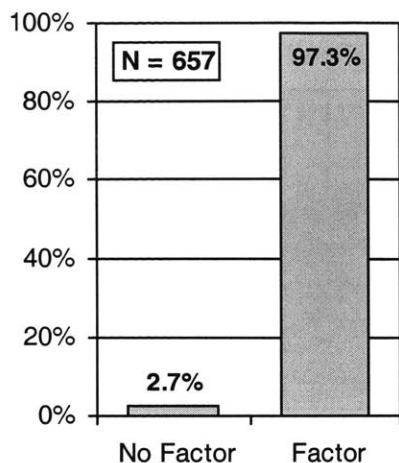


Figure B 137: (Owners) Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

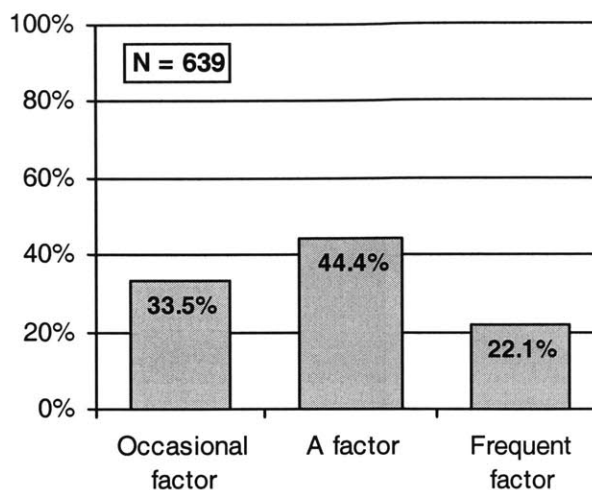


Figure B 138: (Owners) Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

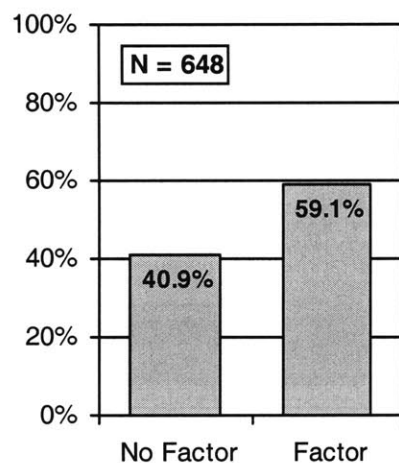


Figure B 139: (Owners) Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

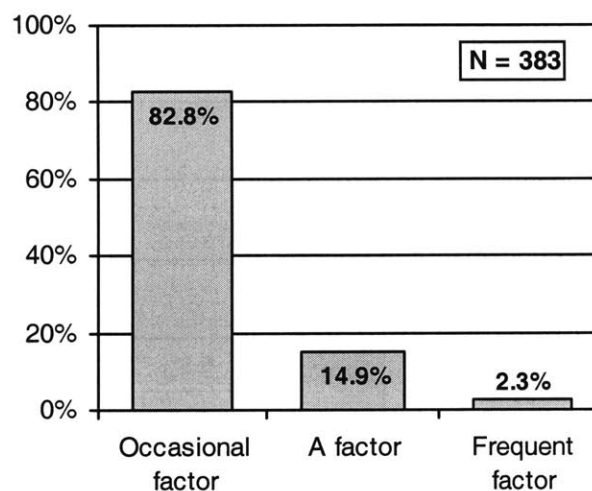


Figure B 140: (Owners) Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

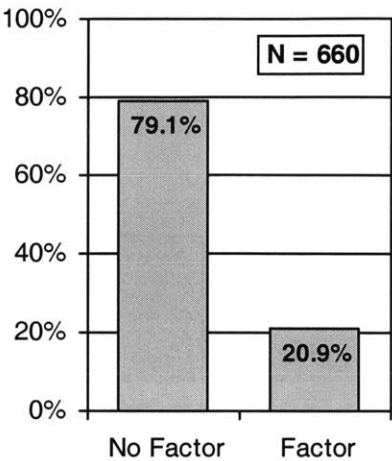


Figure B 141: (Owners) Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

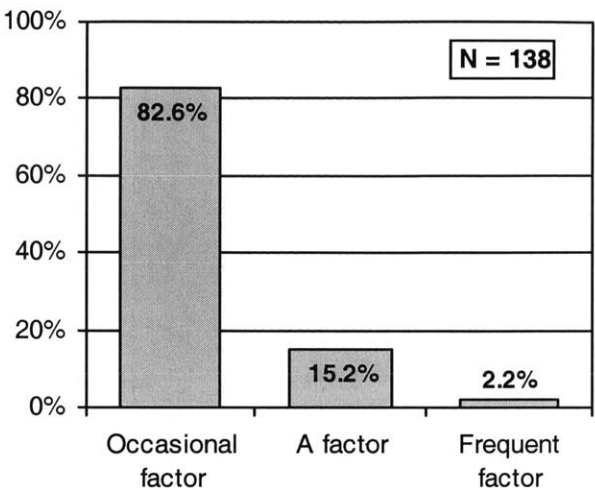


Figure B 142: (Owners) Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

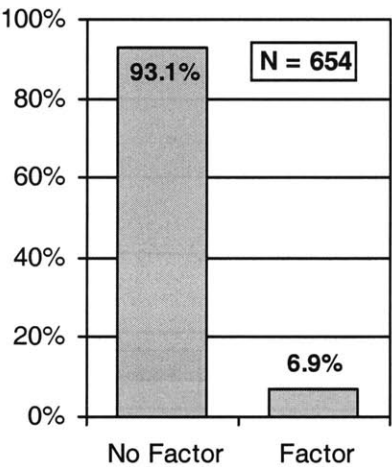


Figure B 143: (Owners) Q13 – (Not Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

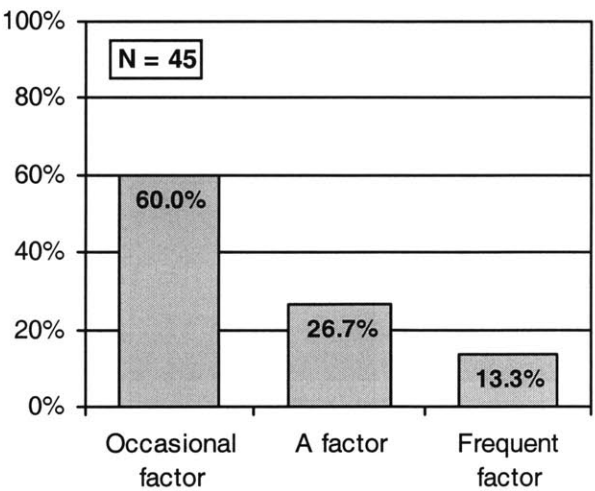


Figure B 144: (Owners) Q13 – (Not Current) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

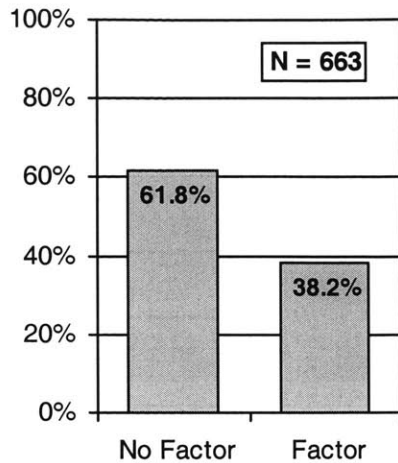


Figure B 145: (Owners) Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

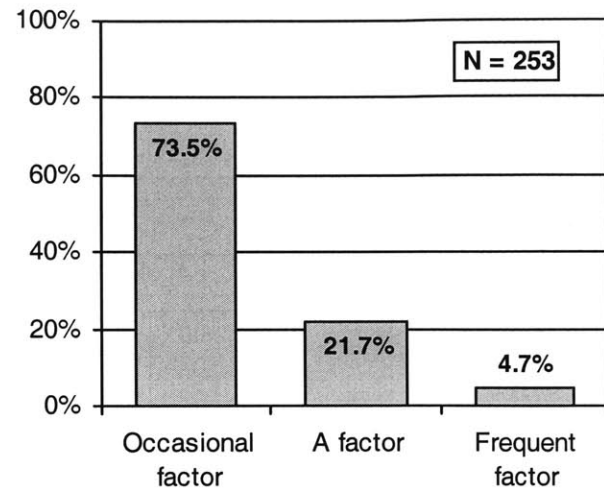


Figure B 146: (Owners) Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

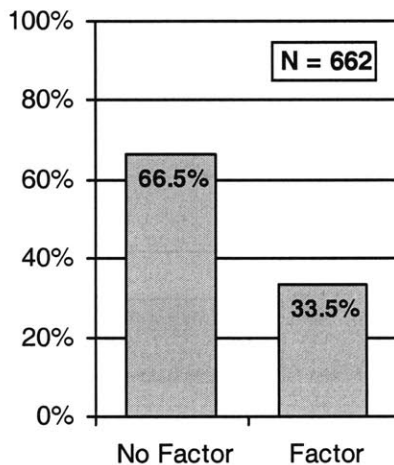


Figure B 147: (Owners) Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

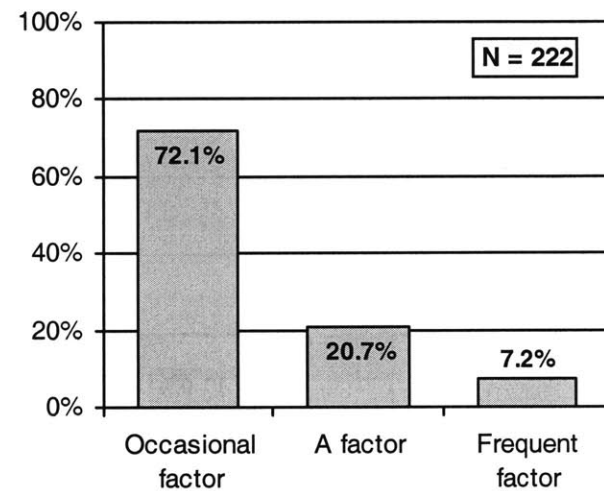


Figure B 148: (Owners) Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

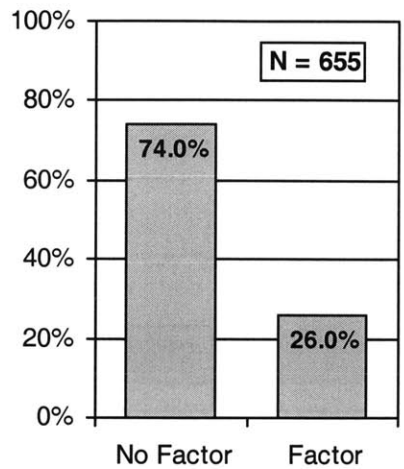


Figure B 149: (Owners) Q13 – (Comfort) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

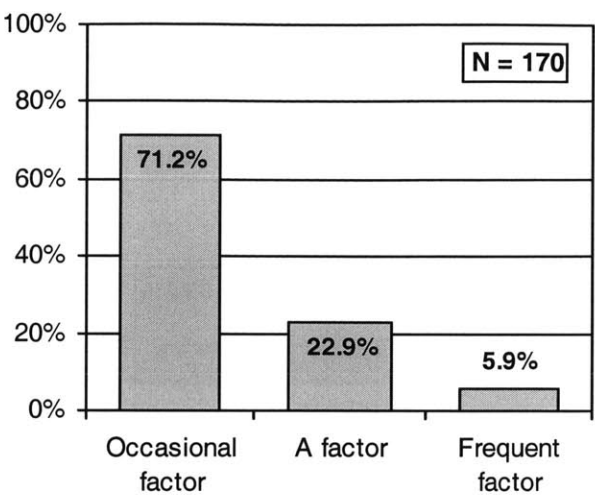


Figure B 150: (Owners) Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

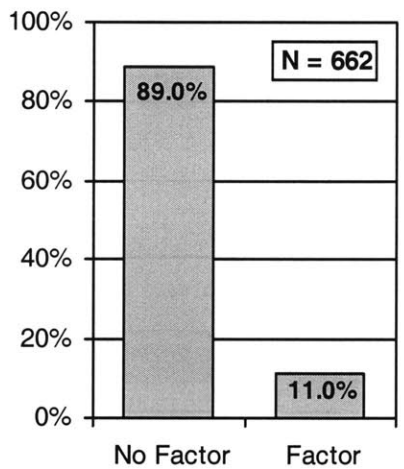


Figure B 151: (Owners) Q13 – (Scheduling) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

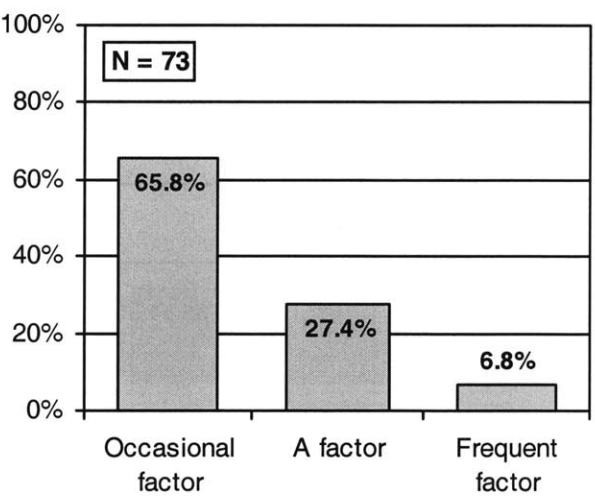


Figure B 152: (Owners) Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

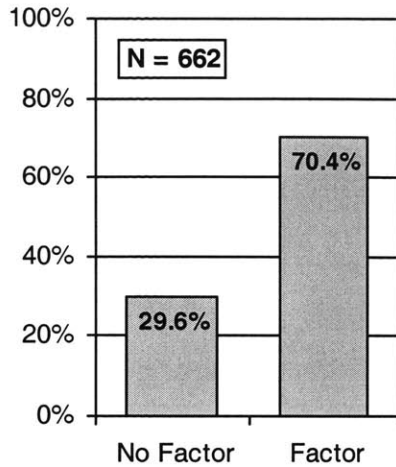


Figure B 153: (Owners) Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

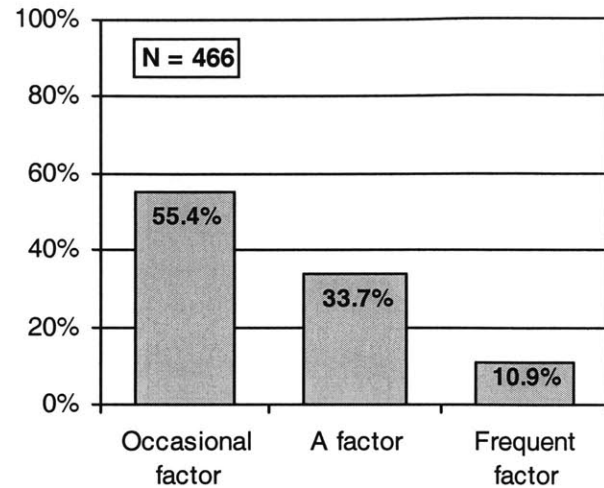


Figure B 154: (Owners) Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

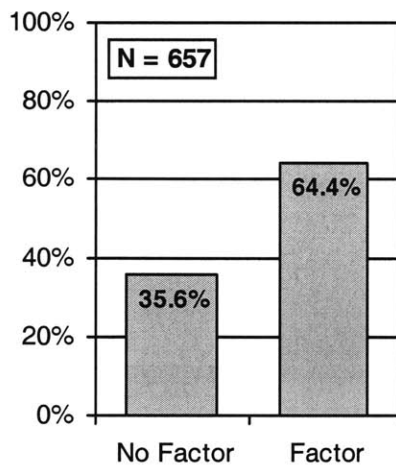


Figure B 155: (Owners) Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

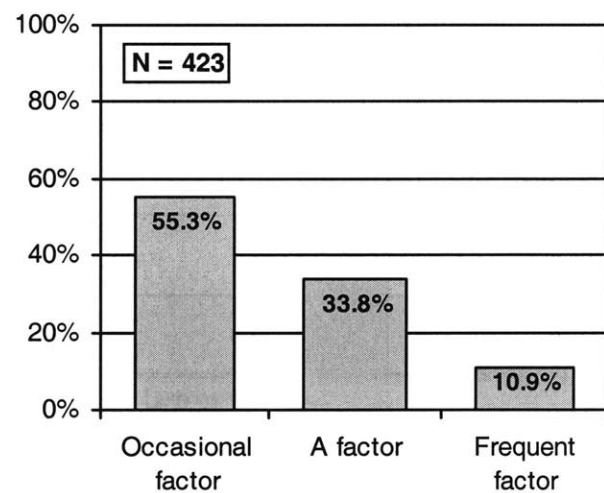


Figure B 156: (Owners) Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

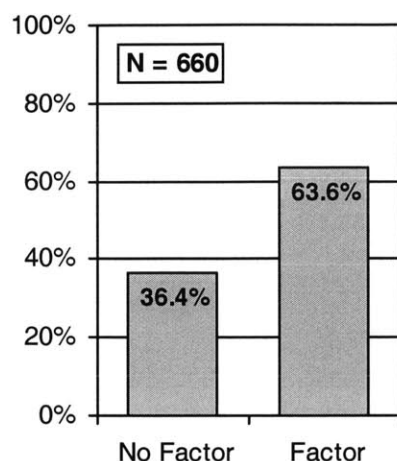


Figure B 157: (Owners) Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

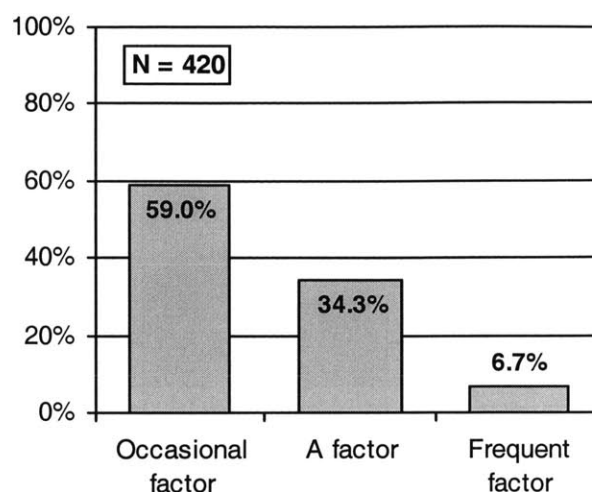


Figure B 158: (Owners) Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

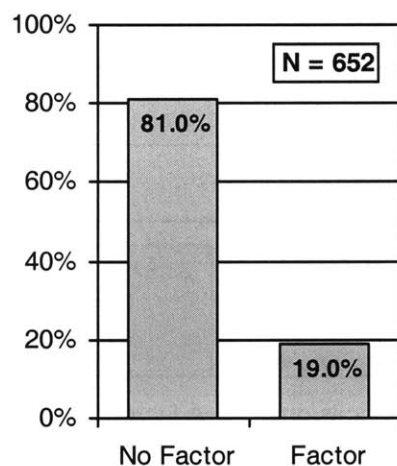


Figure B 159: (Owners) Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

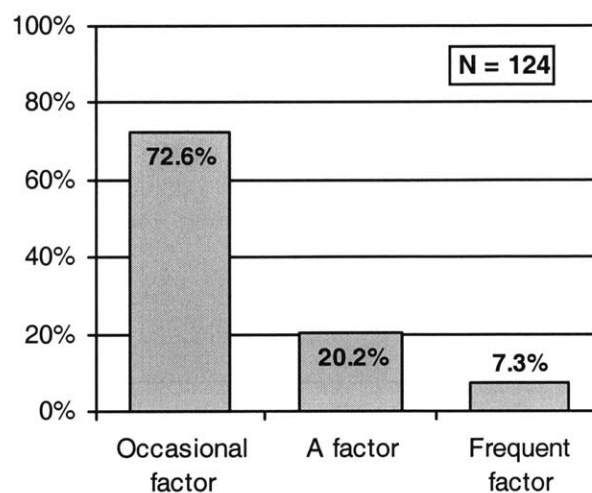


Figure B 160: (Owners) Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

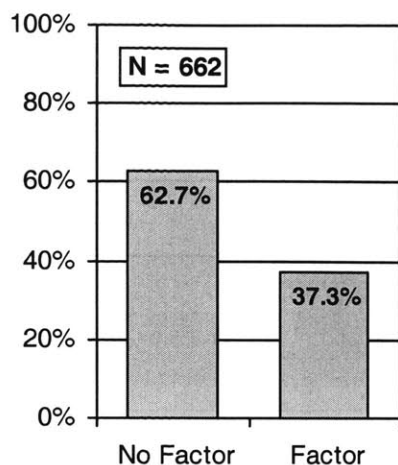


Figure B 161: (Owners) Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

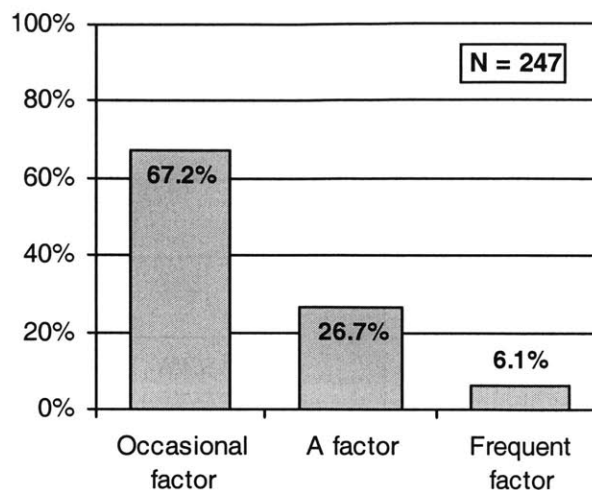


Figure B 162: (Owners) Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

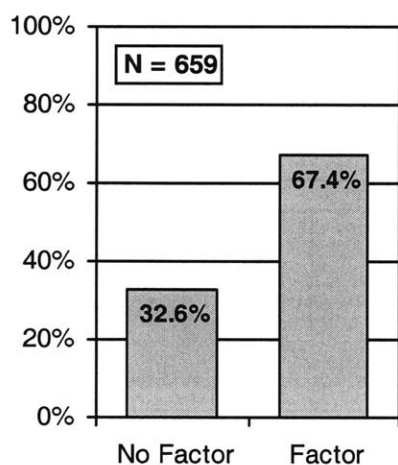


Figure B 163: (Owners) Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

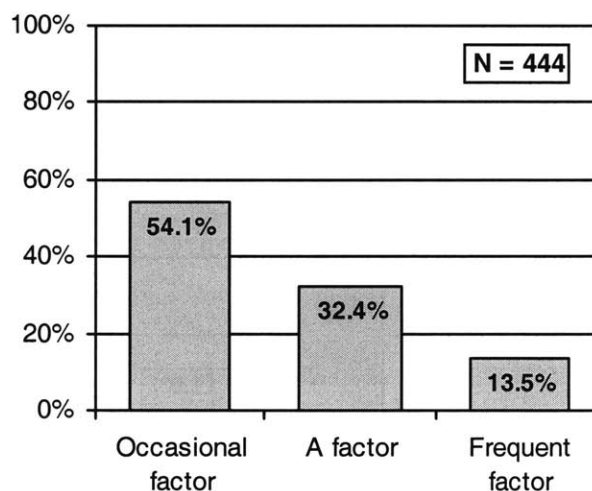


Figure B 164: (Owners) Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

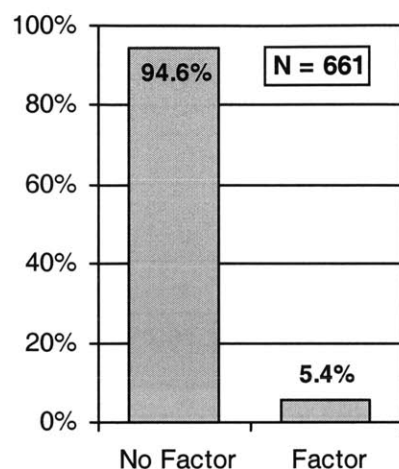


Figure B 165: (Owners) Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

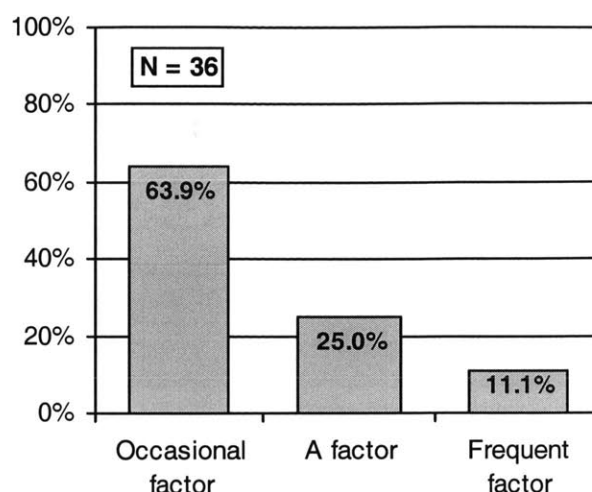


Figure B 166: (Owners) Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

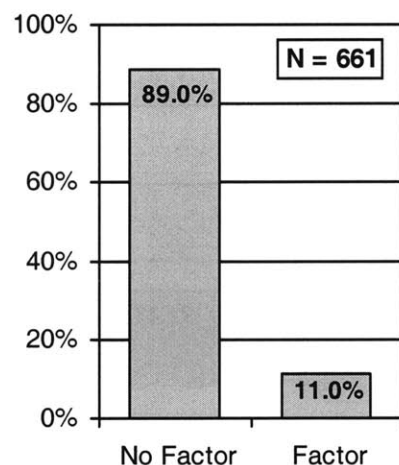


Figure B 167: (Owners) Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

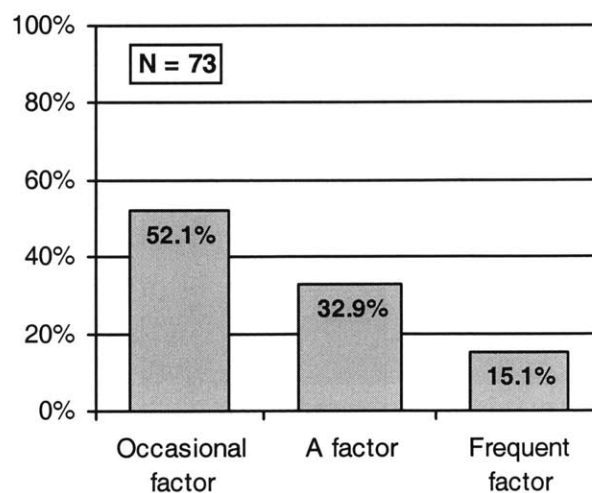


Figure B 168: (Owners) Q13 – (Insurance Costs) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

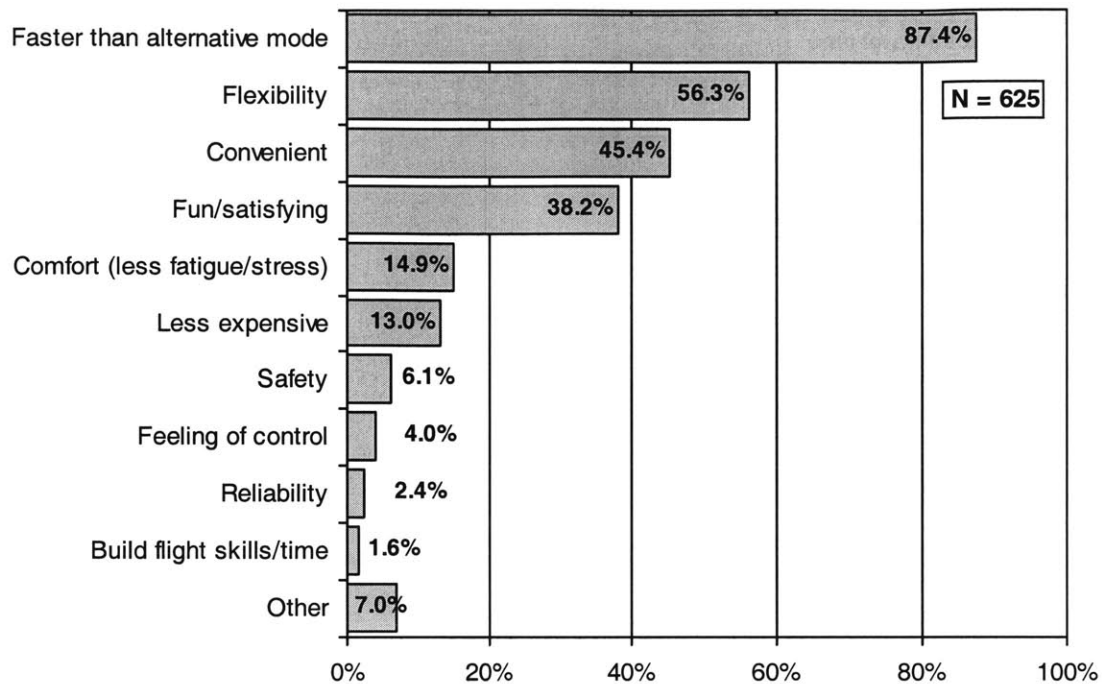


Figure B 169: (Owners) Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

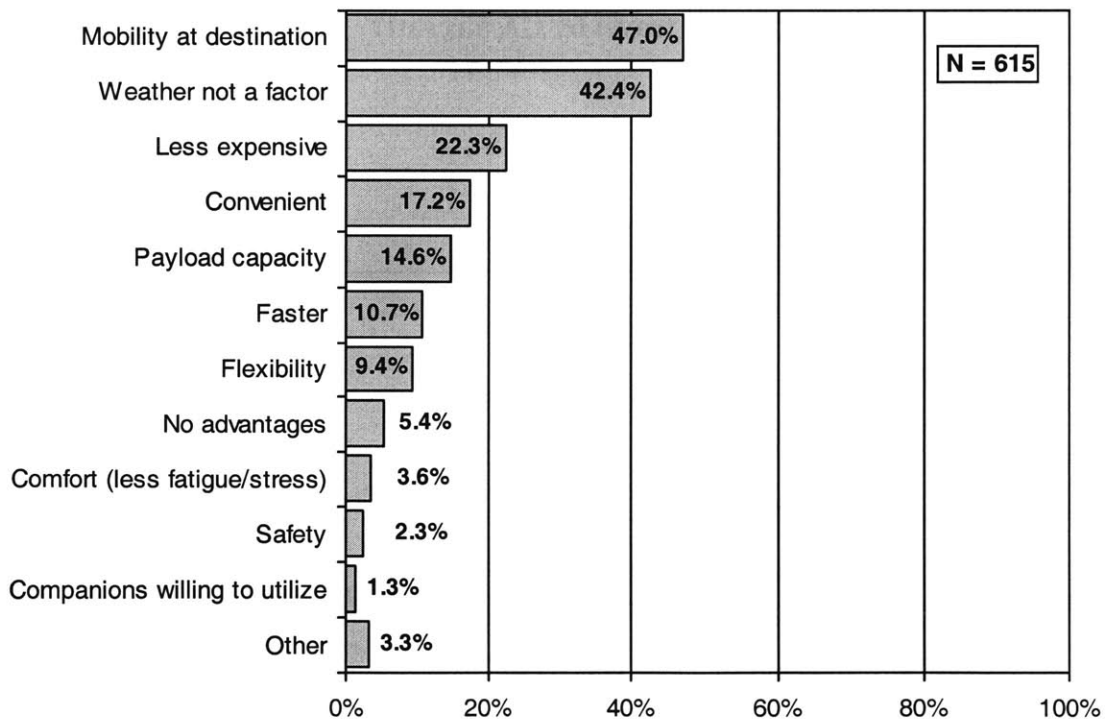


Figure B 170: (Owners) Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

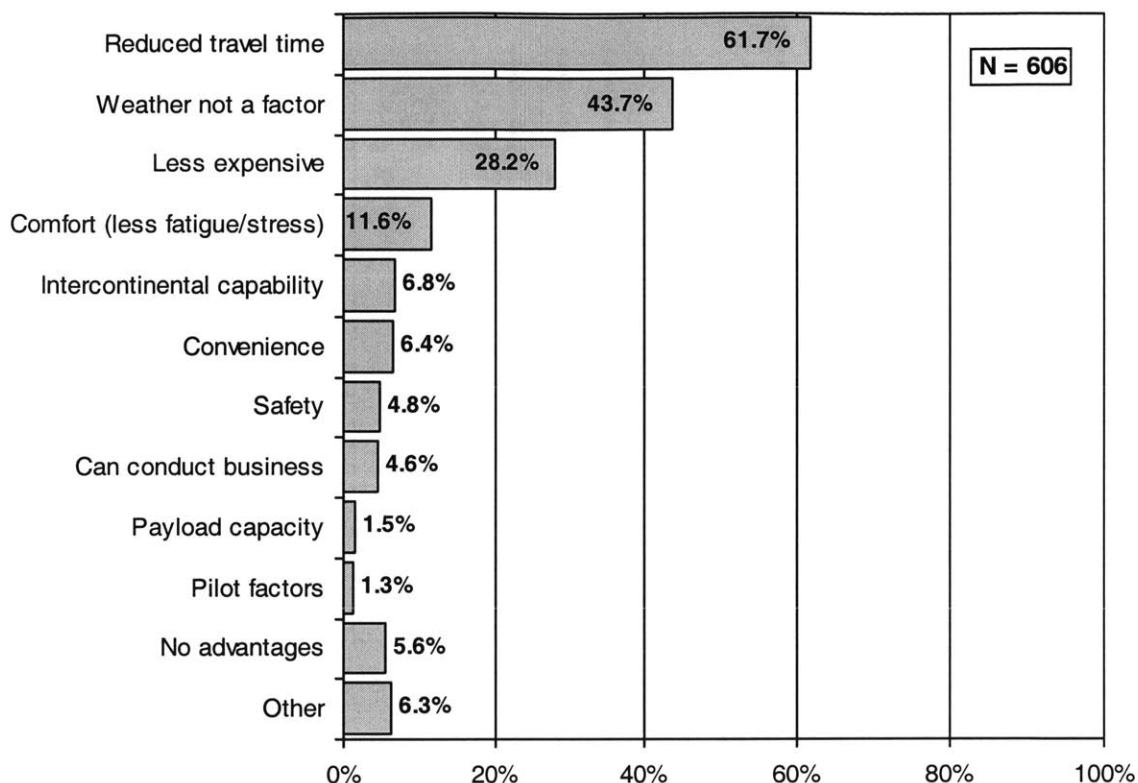


Figure B 171: (Owners) Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

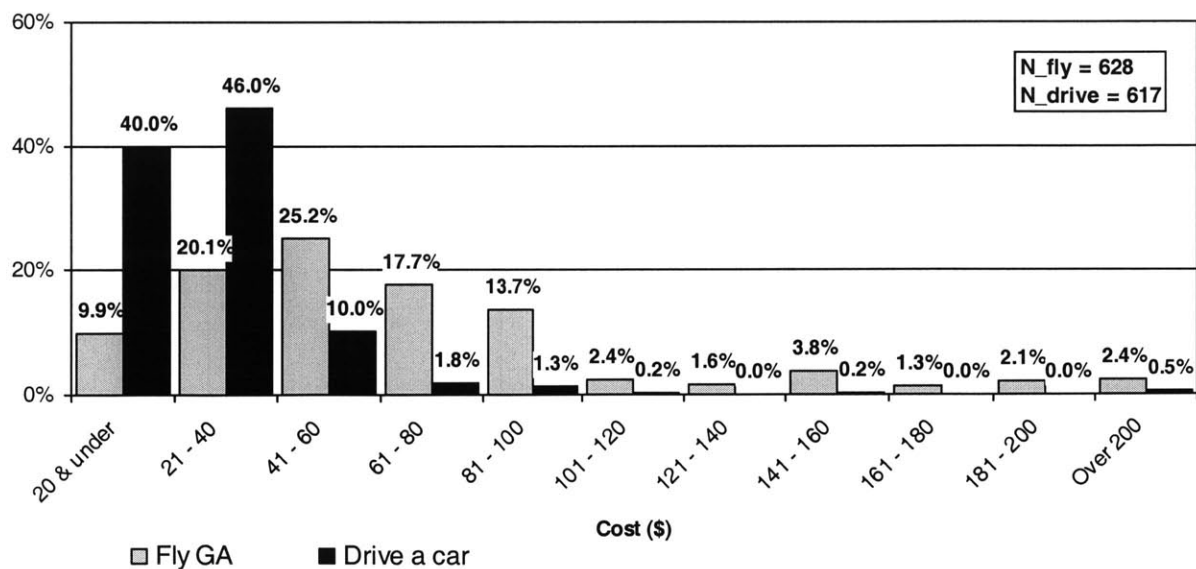


Figure B 172: (Owners) Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

(single engine aircraft only)

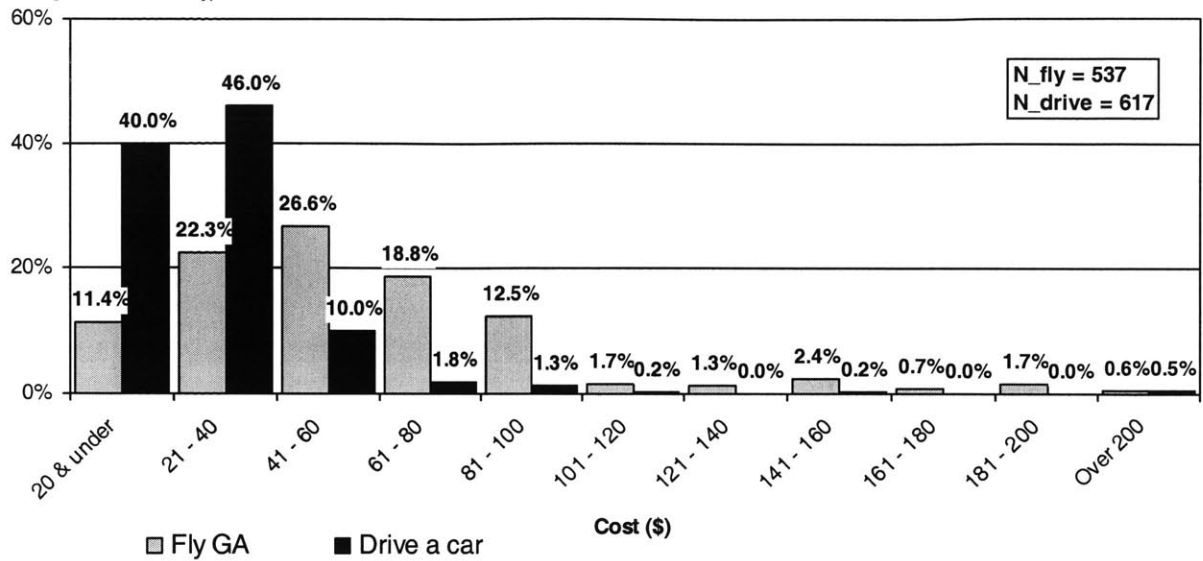


Figure B 173: (Owners) Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

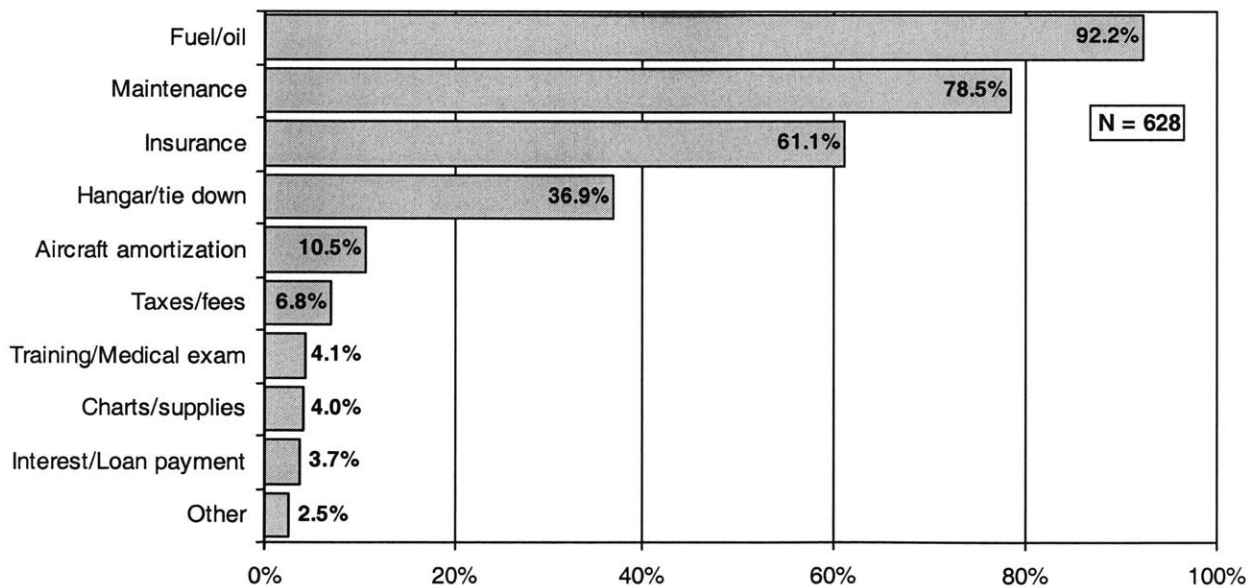


Figure B 174: (Owners) Q17 - What items create this cost to fly 100 statute miles?

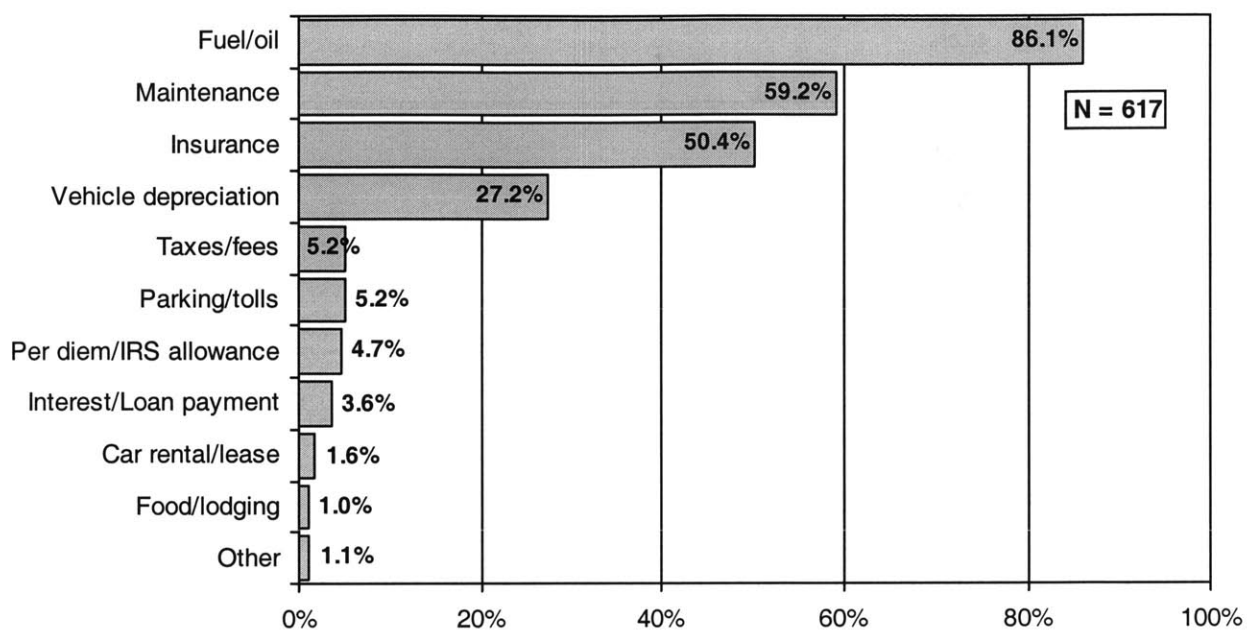


Figure B 175: (Owners) Q18 - What items create this cost to drive a car 100 statute miles?

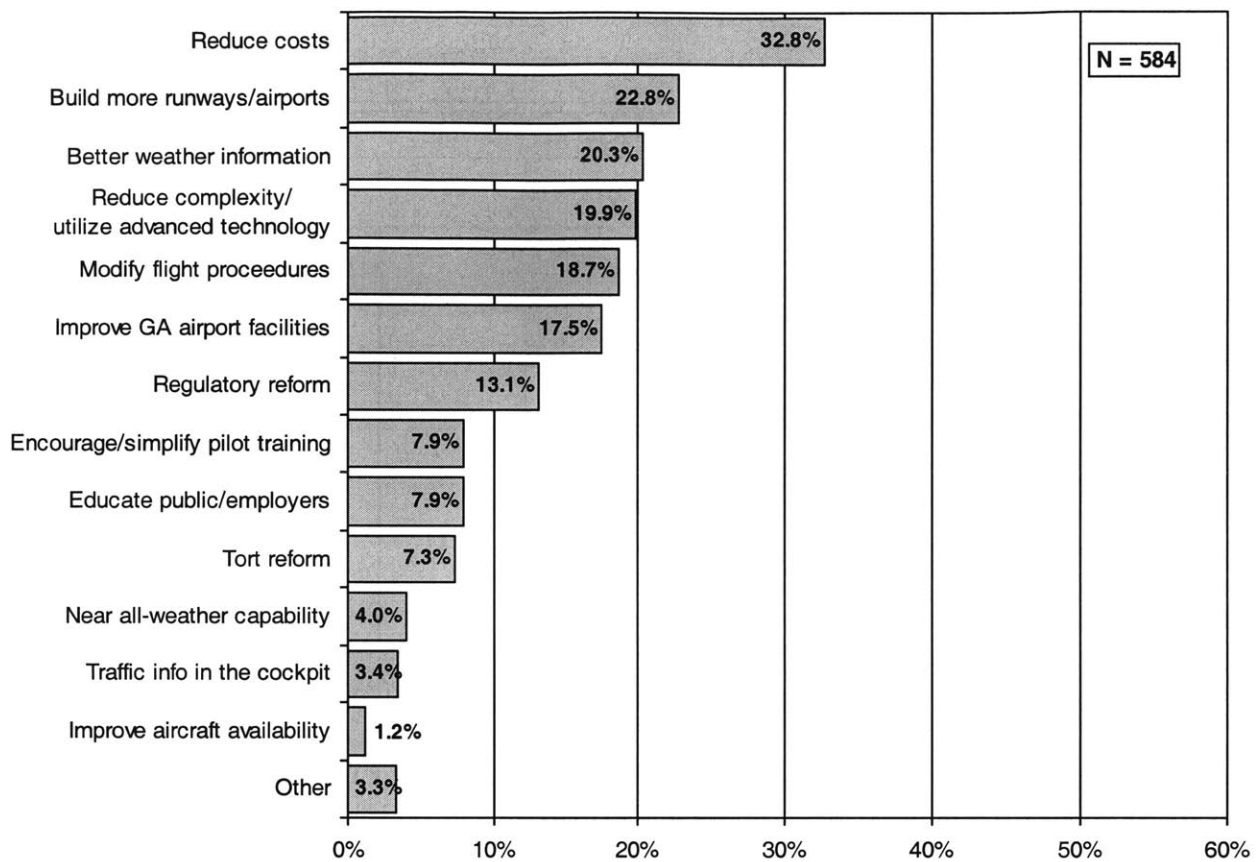


Figure B 176: (Owners) Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

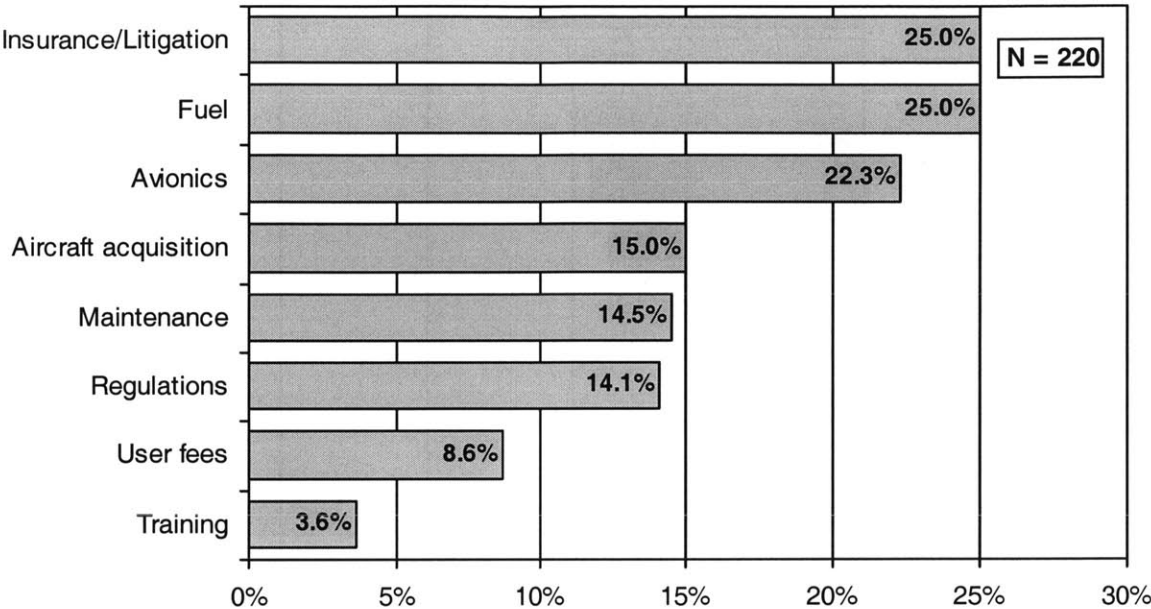


Figure B 177: (Owners) Q19 - Specific Areas Cited For Cost Reduction

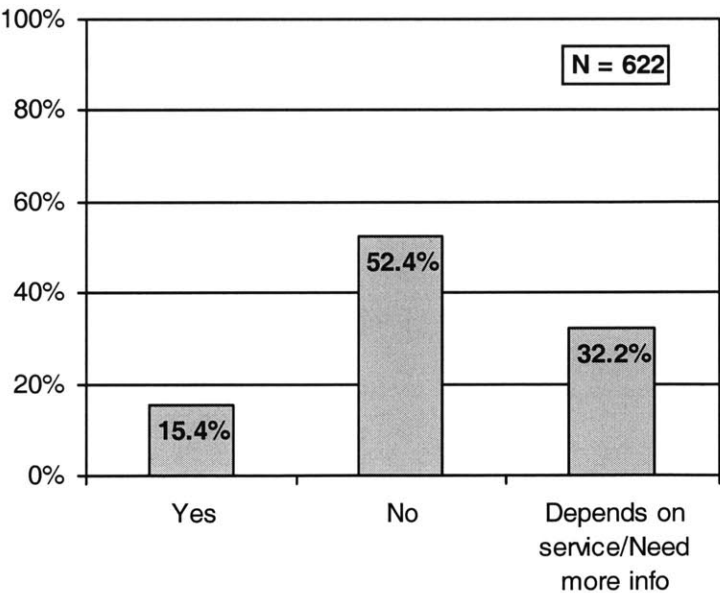


Figure B 178: (Owners) Q20 - Would Those Surveyed Use a Proposed Dispatch Service

B4 SURVEY RESULTS: AIRCRAFT RENTERS

The figures in this section represent the data for only those who indicated in survey question 3 that they typically rented their aircraft. There were 480 responses in this category. The data is presented in the order in which the questions were presented in the survey. See Appendix A for a complete copy of the survey.

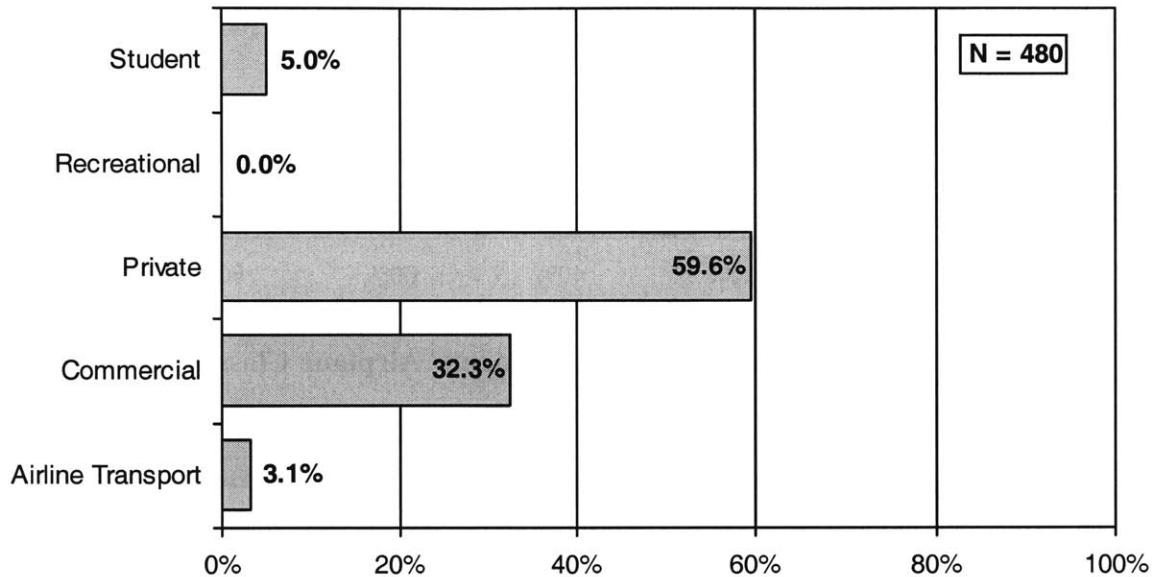


Figure B 179: (Renters) Survey Respondents' Pilot Certificate

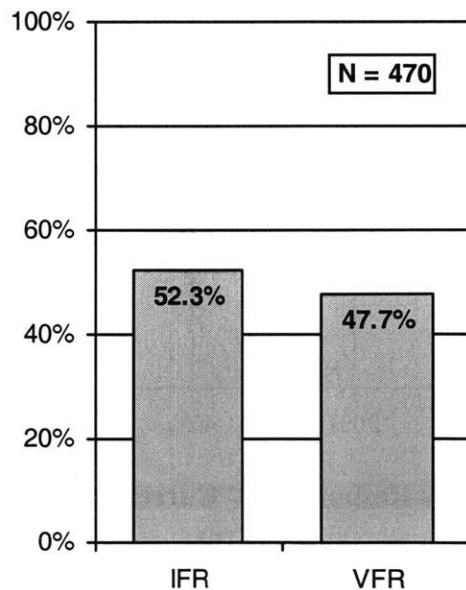


Figure B 180: (Renters) Survey Respondents' Instrument Rating

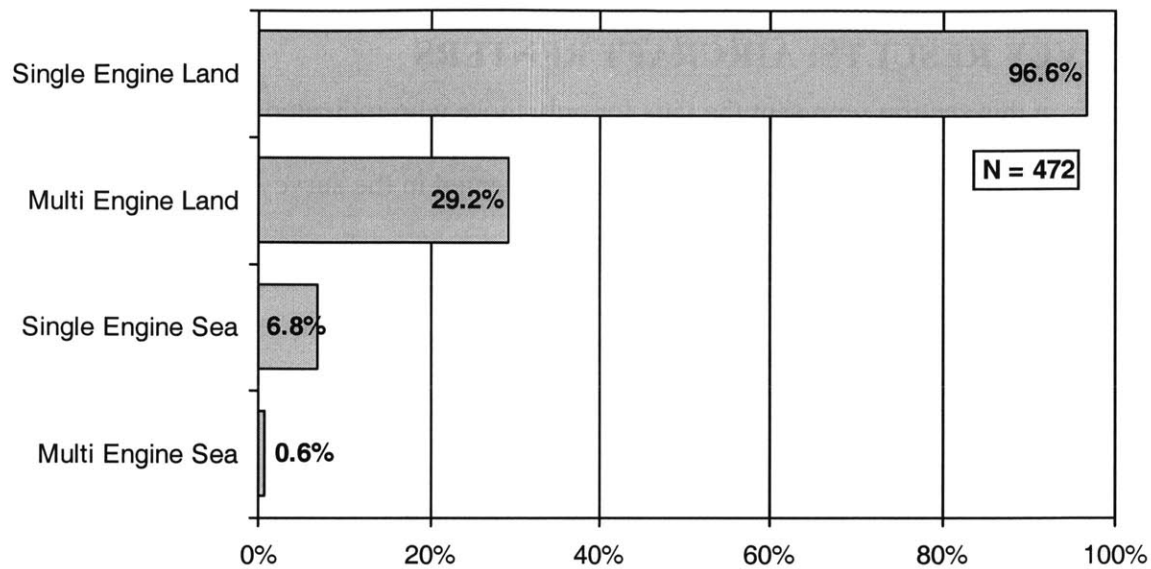


Figure B 181: (Renters) Survey Respondents' Airplane Class Rating

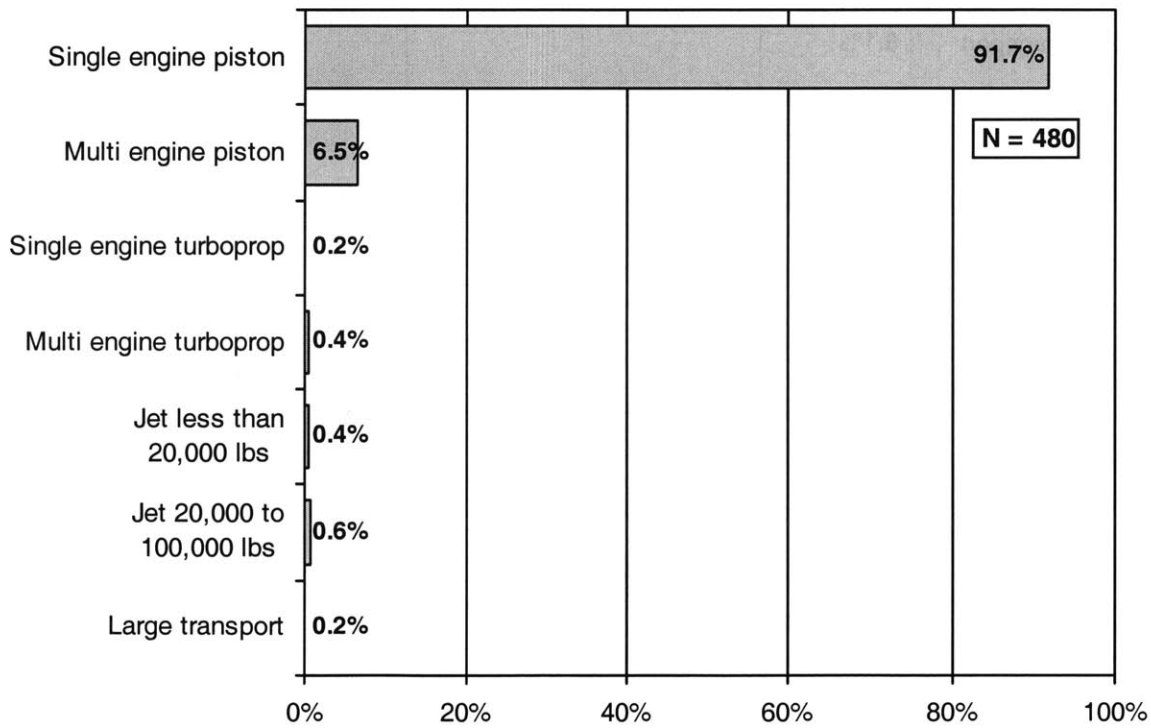


Figure B 182: (Renters) Survey Respondents' Current Airplane Type Considered for the Survey

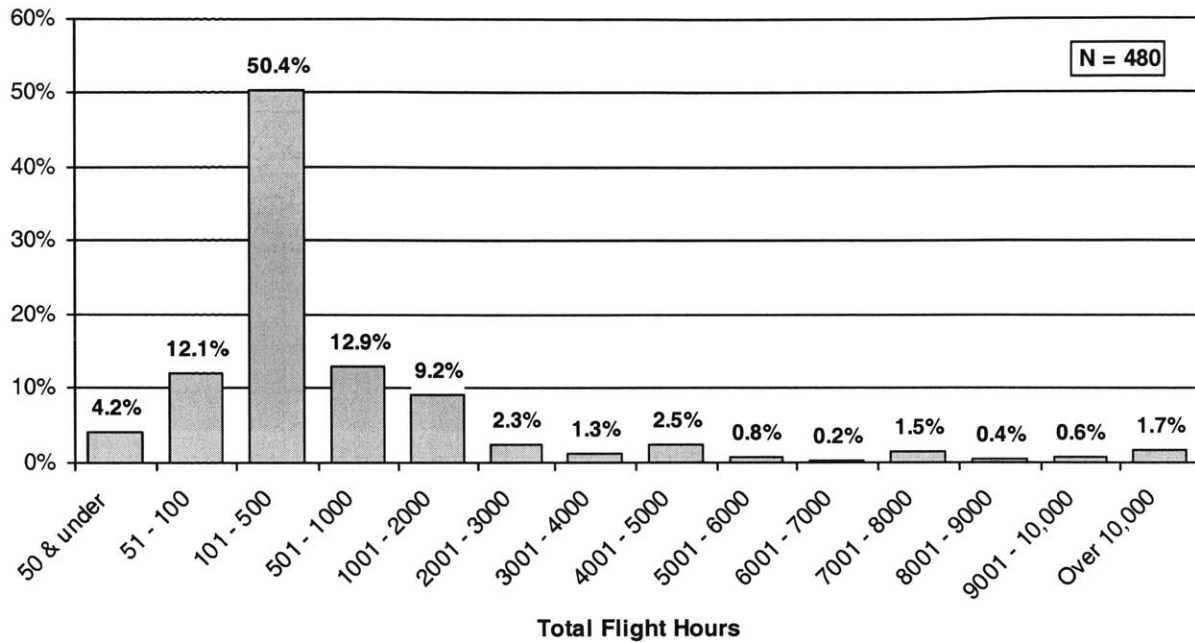


Figure B 183: (Renters) Survey Respondents' Total Flight Hours

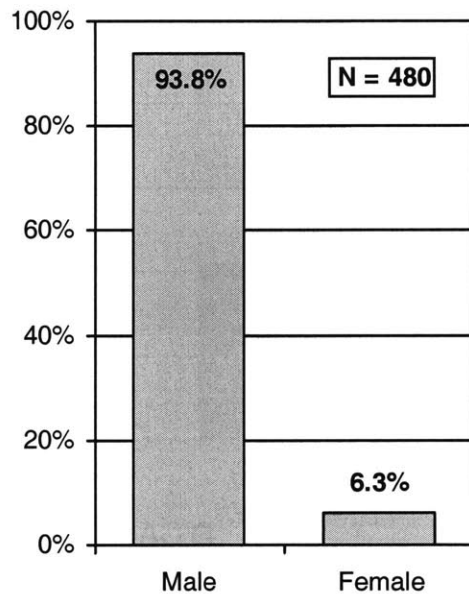


Figure B 184: (Renters) Survey Respondents' Gender

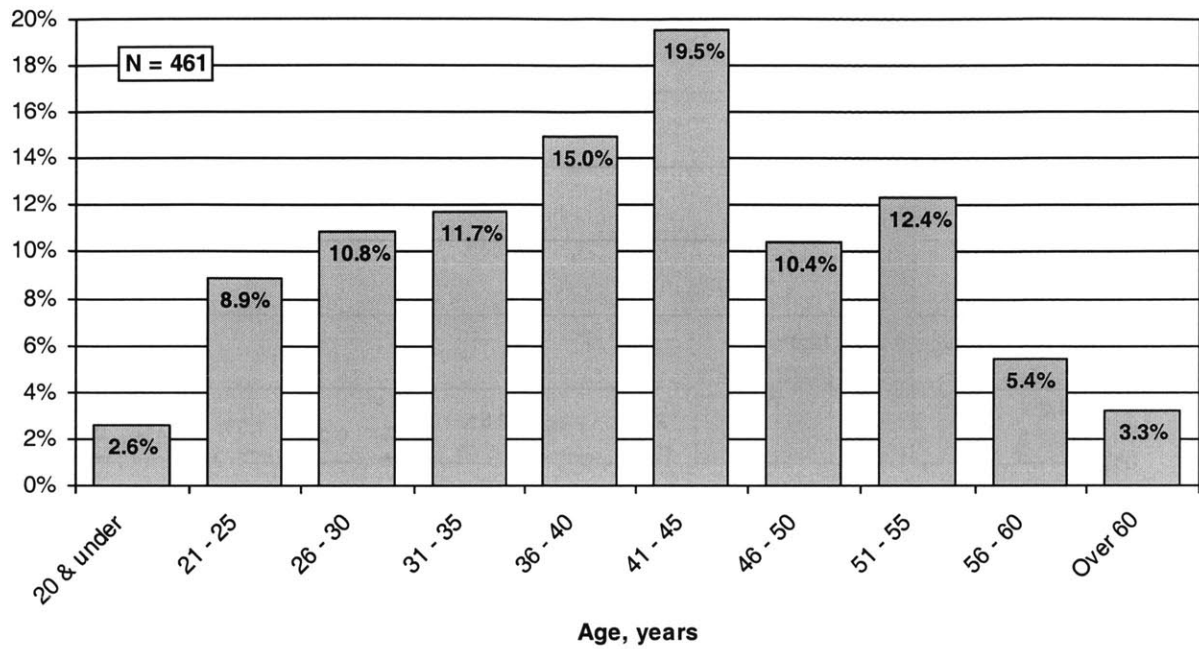


Figure B 185: (Renters) Survey Respondents' Age

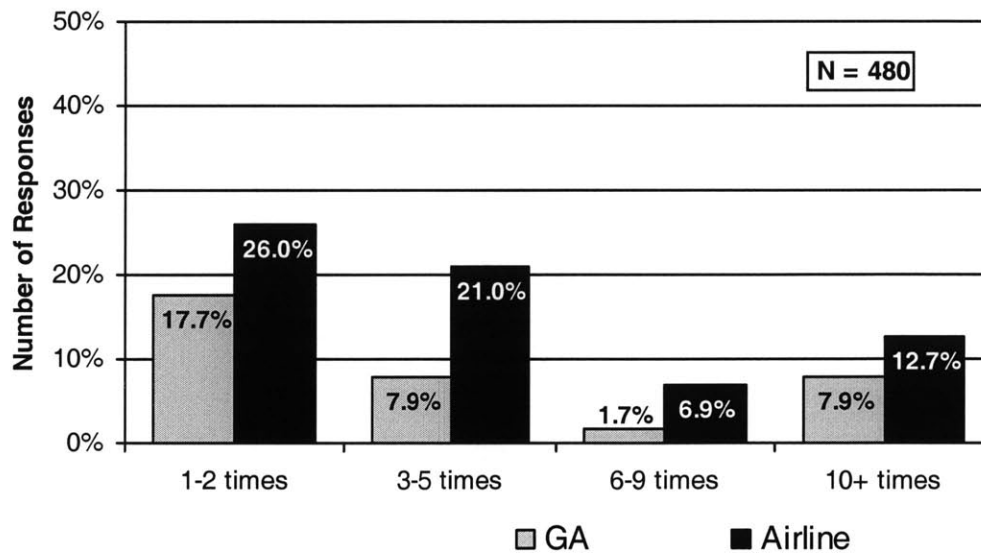


Figure B 186: (Renters) Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

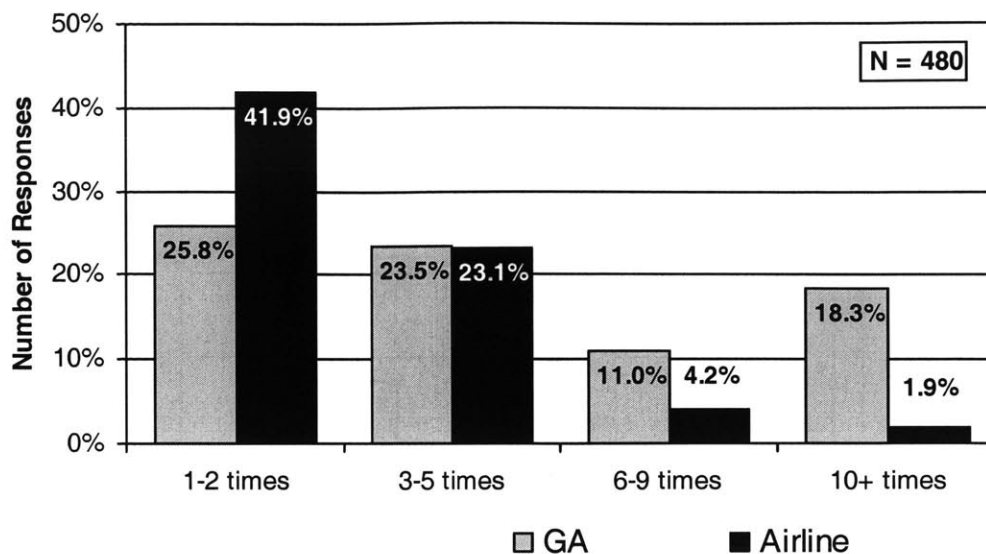


Figure B 187: (Renters) Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

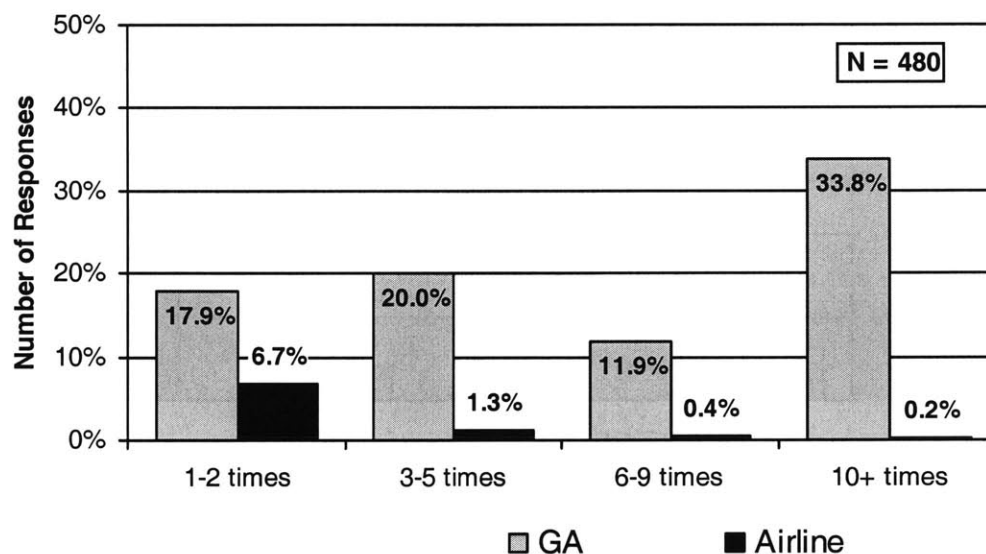


Figure B 188: (Renters) Q1 & Q2 - Trips Taken For Pure Recreation

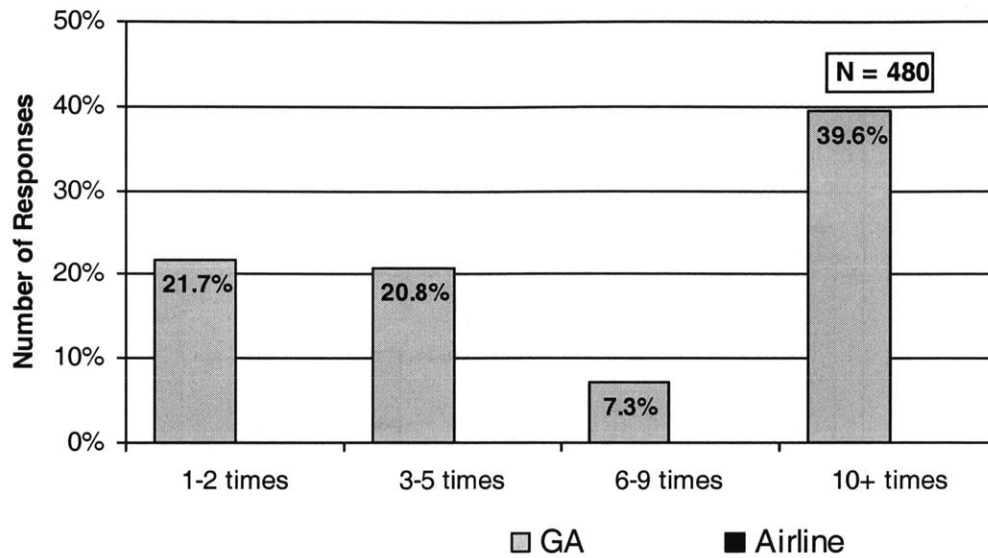


Figure B 189: (Renters) Q1 & Q2 - Trips Taken For Training

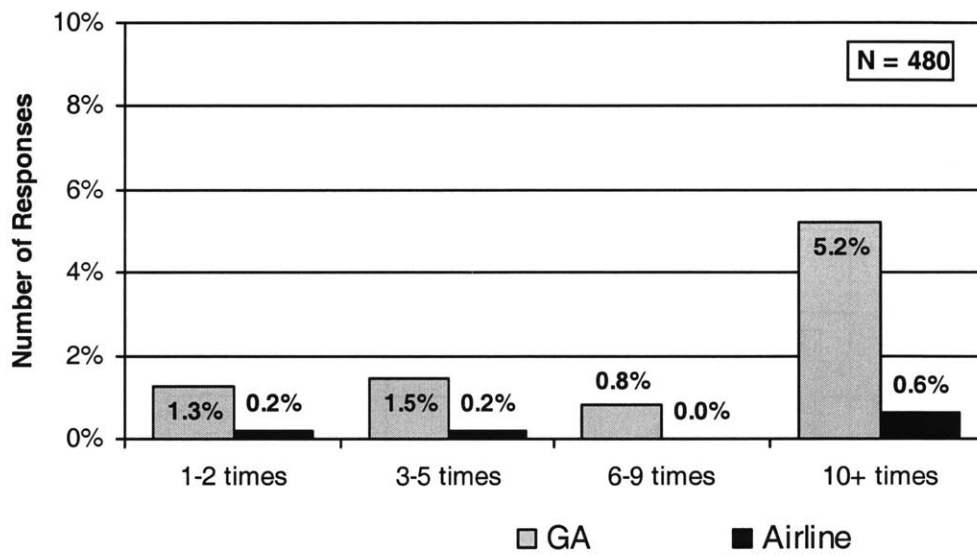


Figure B 190: (Renters) Q1 & Q2 - Trips Taken For Other Purposes

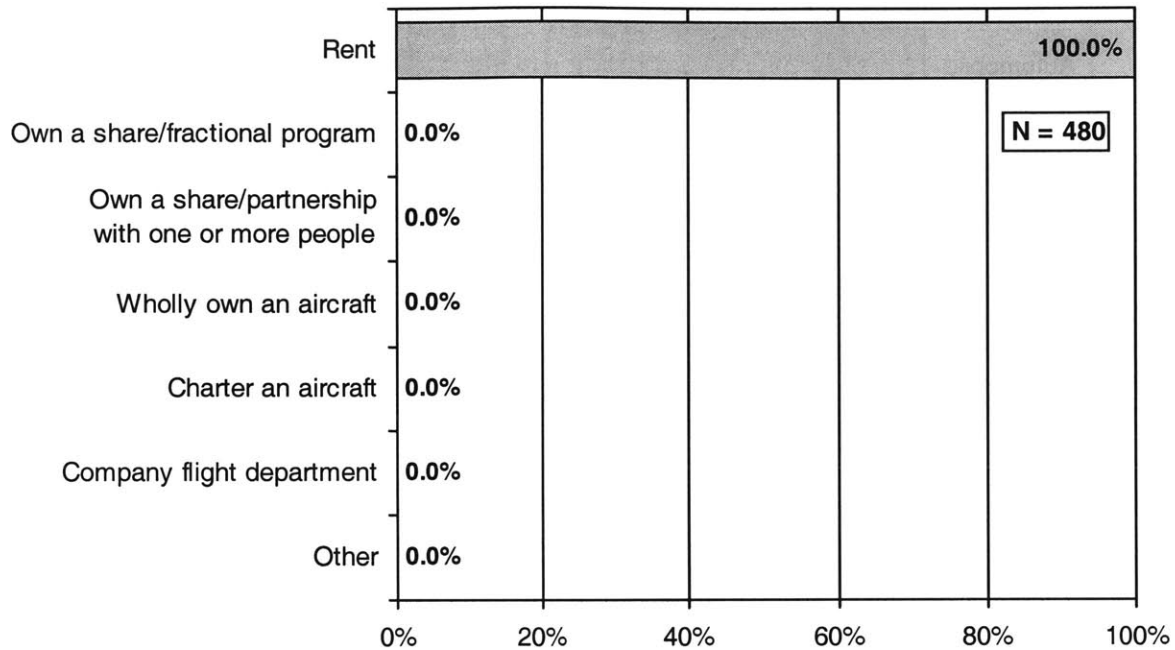


Figure B 191: (Renters) Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

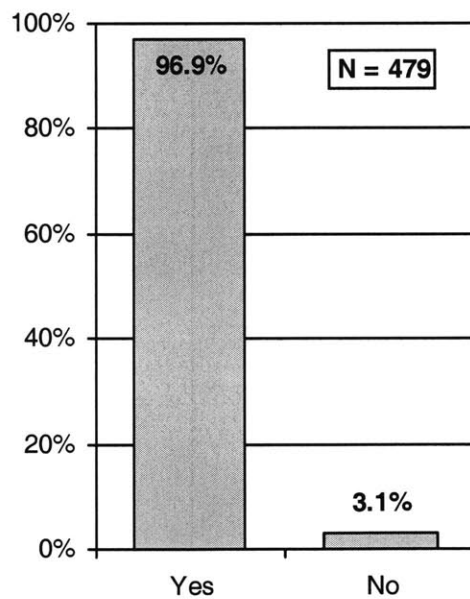


Figure B 192: (Renters) Q4 - When you fly on GA aircraft are you typically the pilot in command?

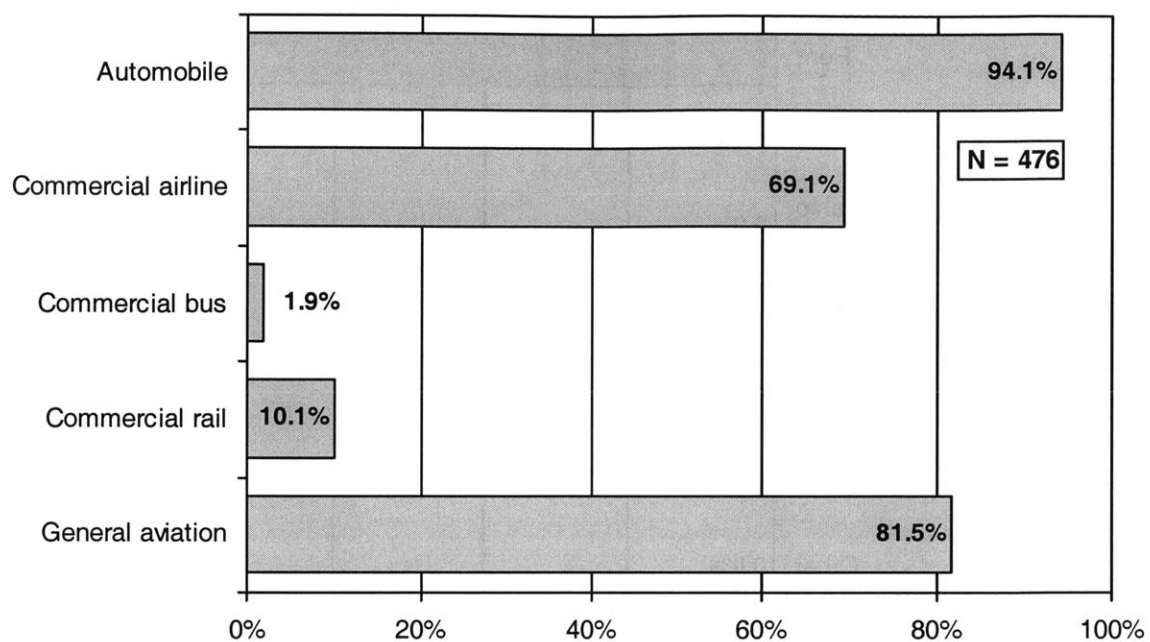


Figure B 193: (Renters) Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

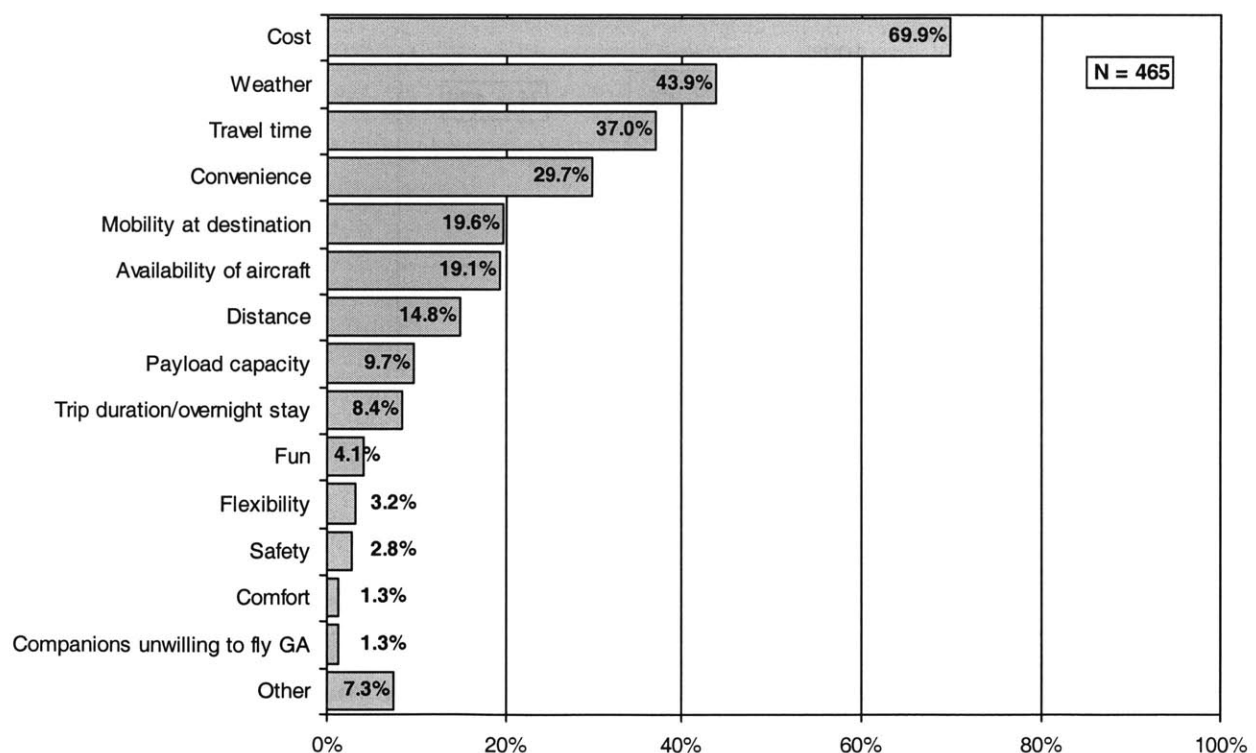


Figure B 194: (Renters) Q6 - What factors are your major considerations in choosing among the various modes of transportation?

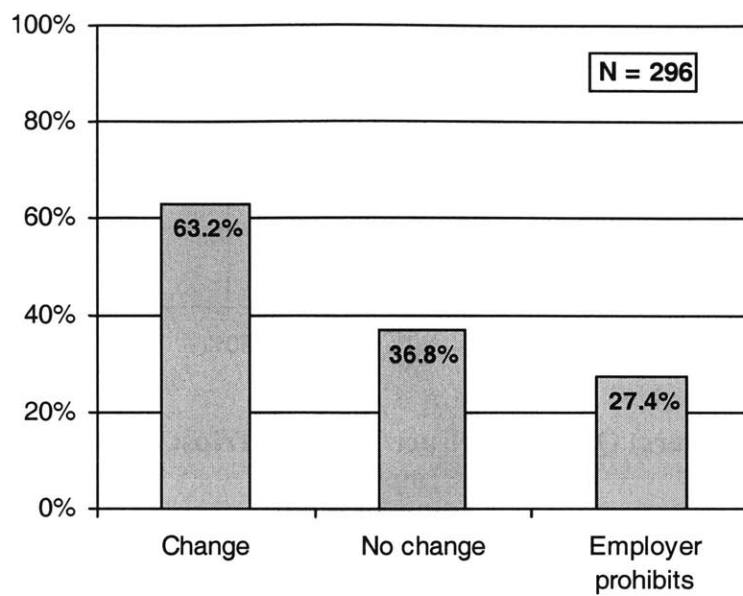


Figure B 195: (Renters) Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

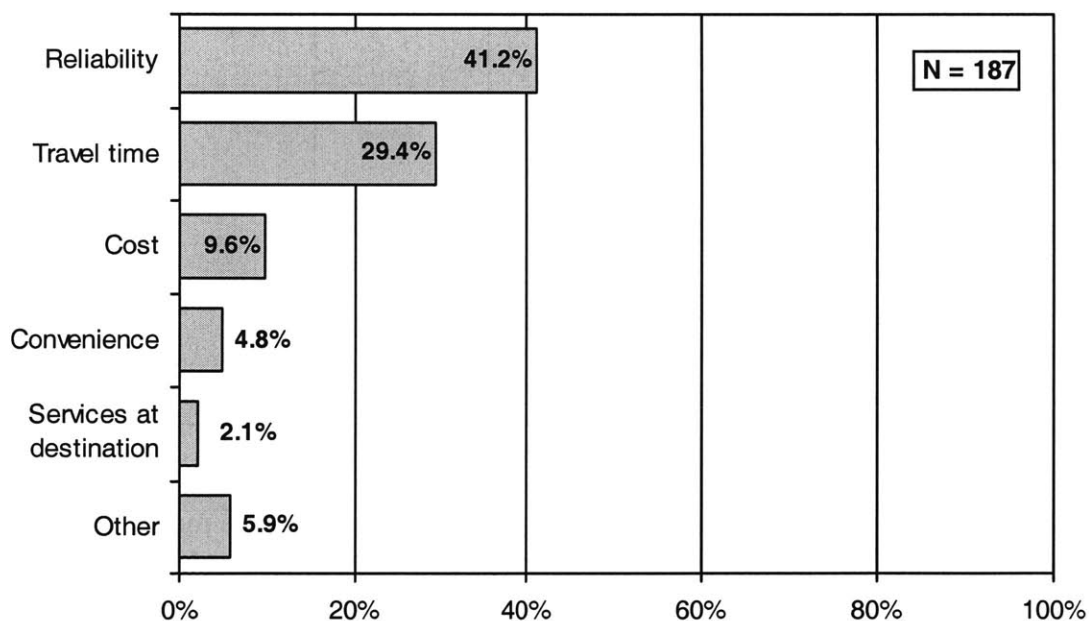


Figure B 196: (Renters) Q7 - For Business Trips: Factors That Become More Important

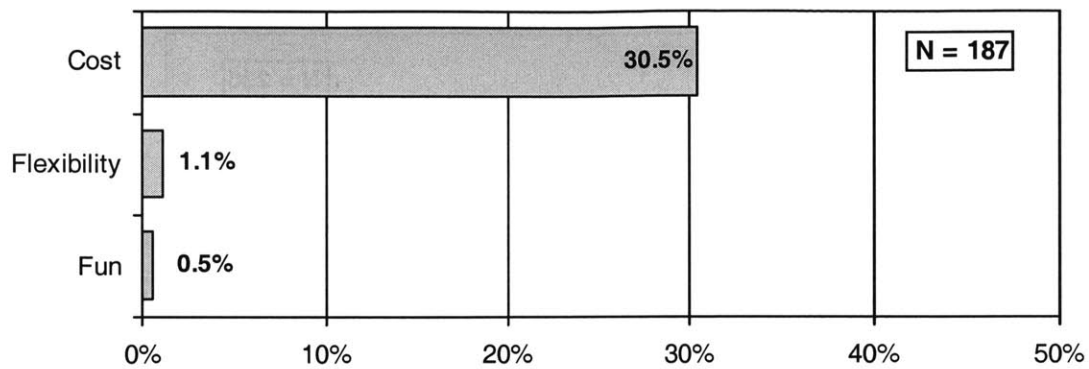


Figure B 197: (Renters) Q7 - For Leisure/Personal Trips: Factors That Become More Important

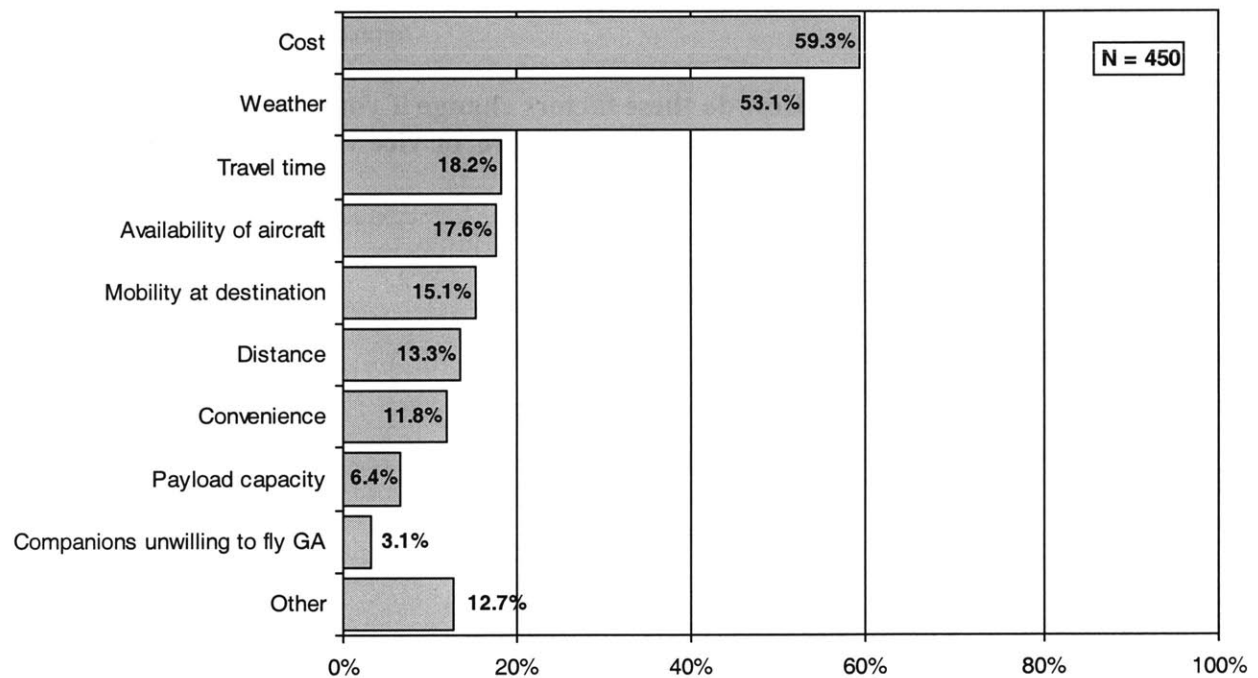


Figure B 198: (Renters) Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

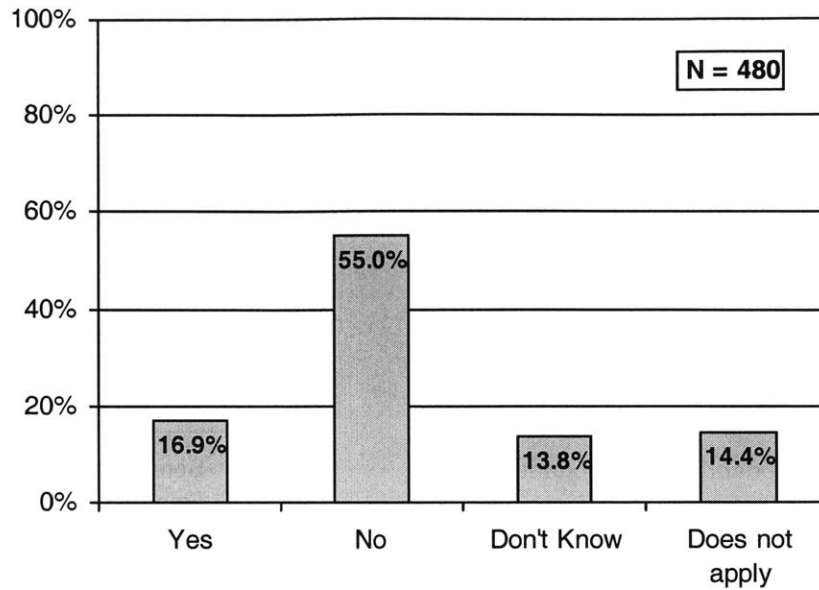


Figure B 199: (Renters) Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

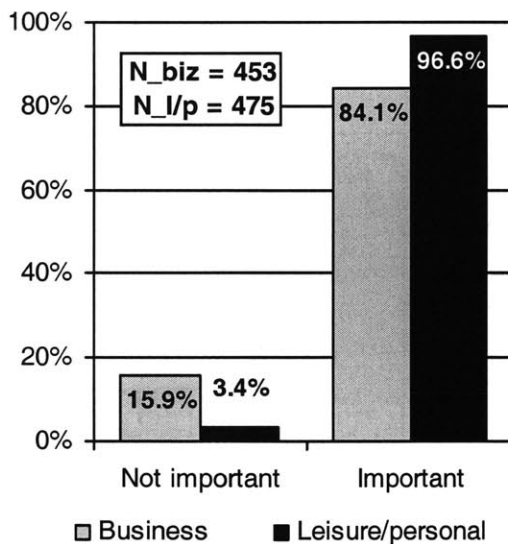


Figure B 200: (Renters) Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

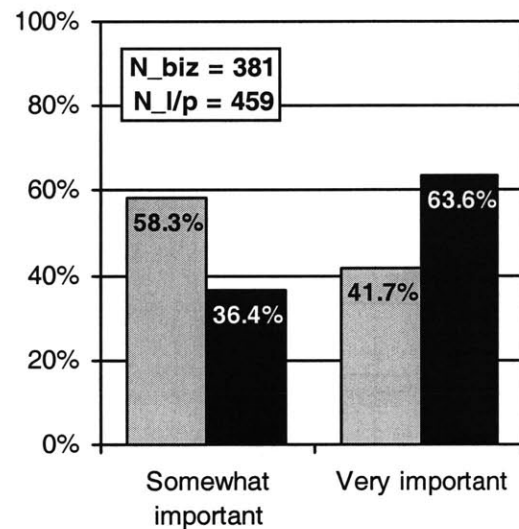


Figure B 201: (Renters) Q10 – (Expense) Of those who rated the issue "important," the degree to which they considered it important

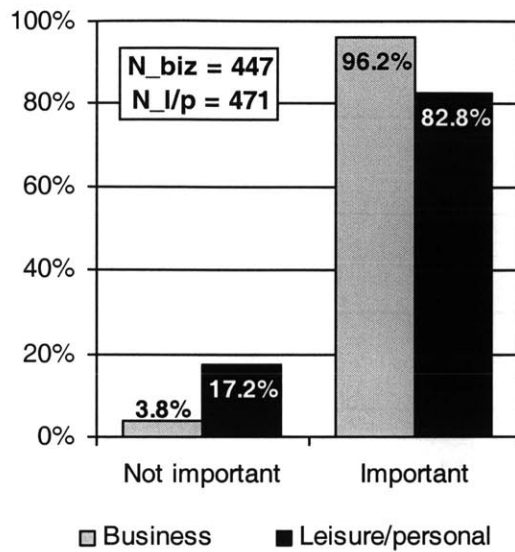


Figure B 202: (Renters) Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

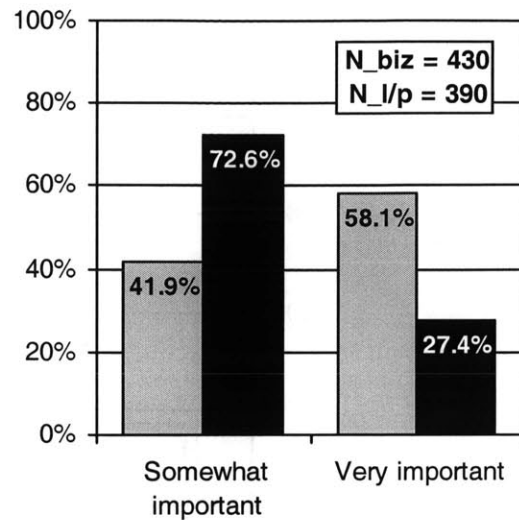


Figure B 203: (Renters) Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

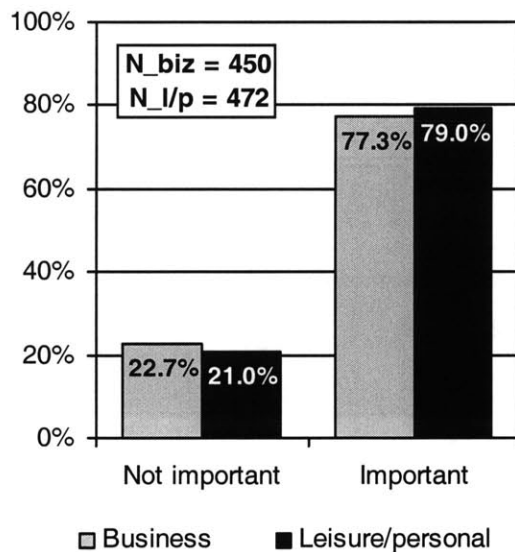


Figure B 204: (Renters) Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

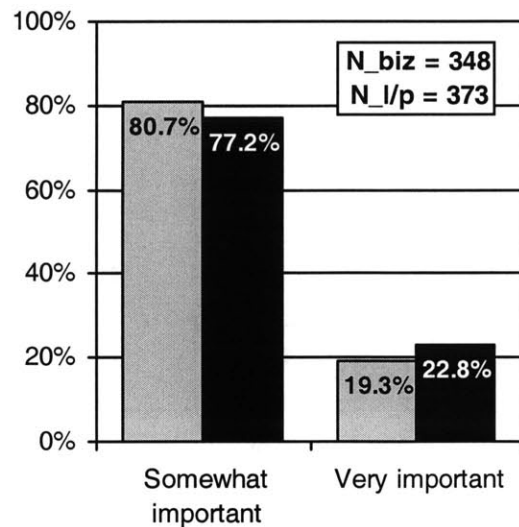


Figure B 205: (Renters) Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

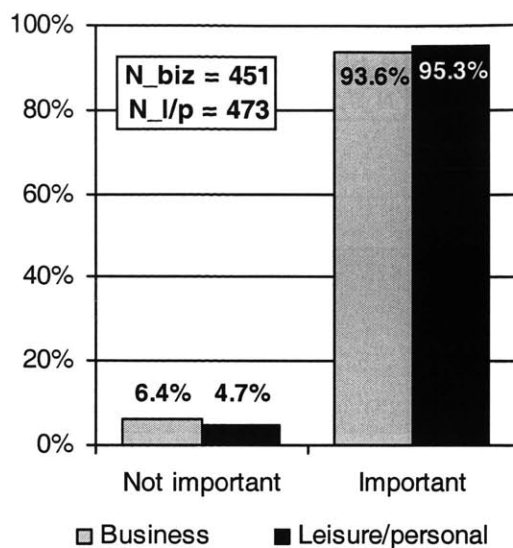


Figure B 206: (Renters) Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

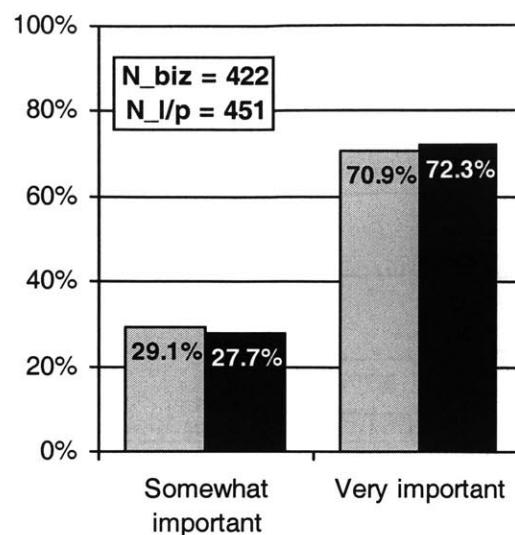


Figure B 207: (Renters) Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

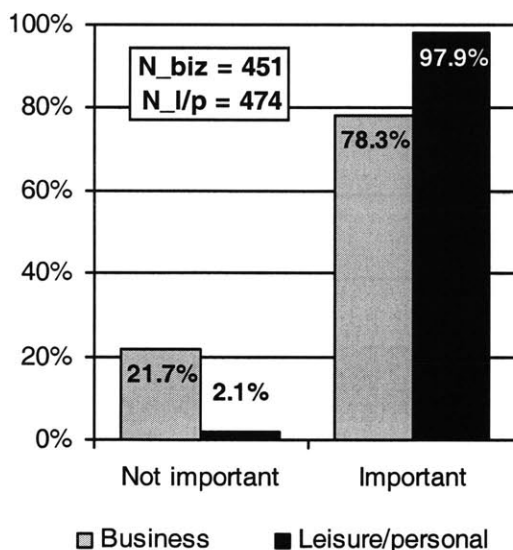


Figure B 208: (Renters) Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

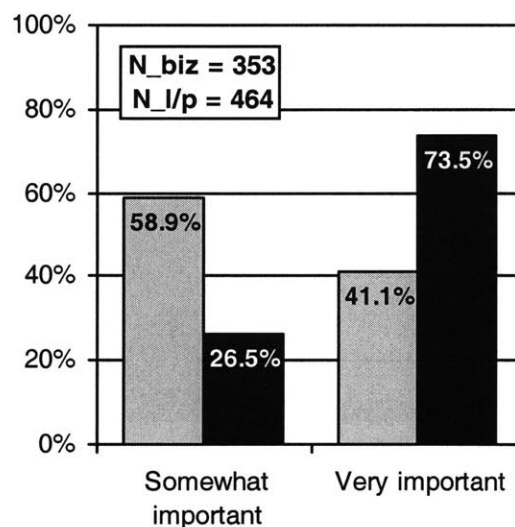


Figure B 209: (Renters) Q10 – (Fun) Of those who rated the issue “important,” the degree to which they considered it important

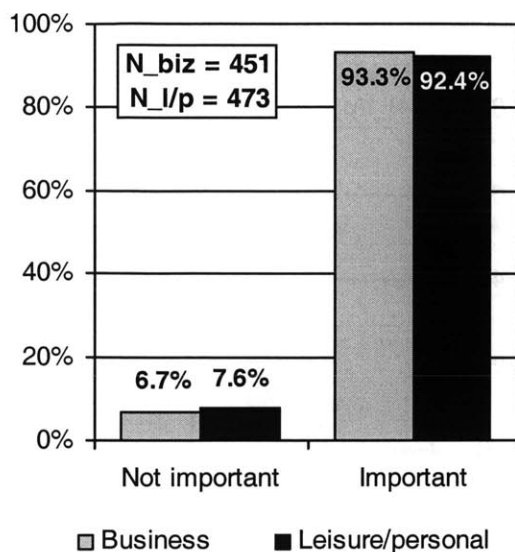


Figure B 210: (Renters) Q10 – (Flexibility)
How important to you are the following issues in choosing your mode of travel?

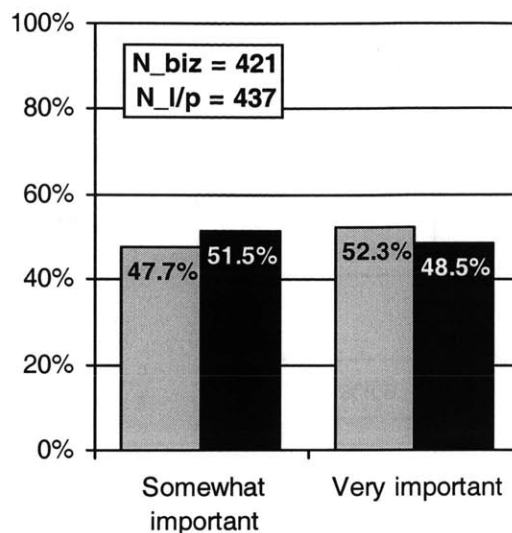


Figure B 211: (Renters) Q10 – (Flexibility)
Of those who rated the issue “important,” the degree to which they considered it important

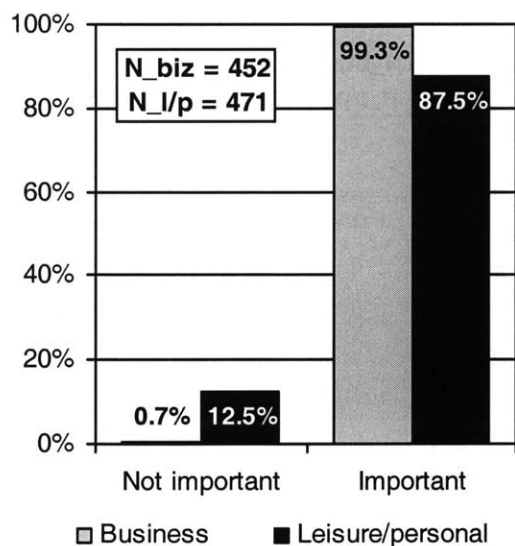


Figure B 212: (Renters) Q10 – (Reliability)
How important to you are the following issues in choosing your mode of travel?

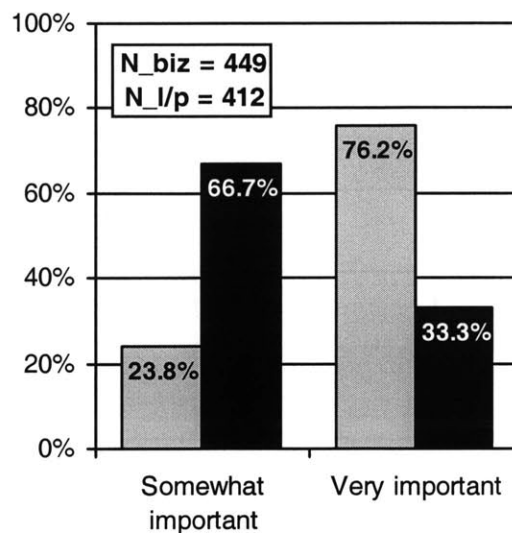


Figure B 213: (Renters) Q10 – (Reliability)
Of those who rated the issue “important,” the degree to which they considered it important

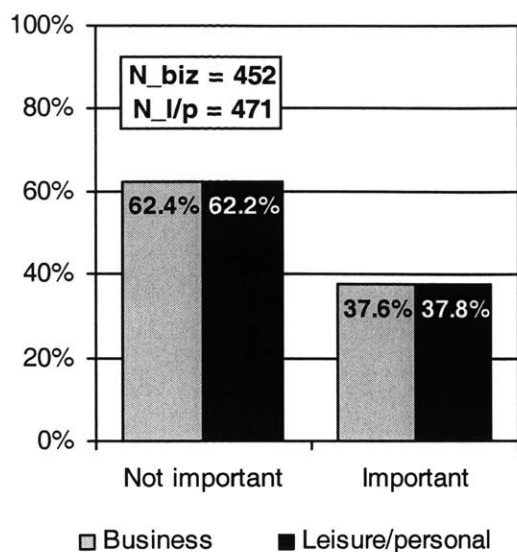


Figure B 214: (Renters) Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

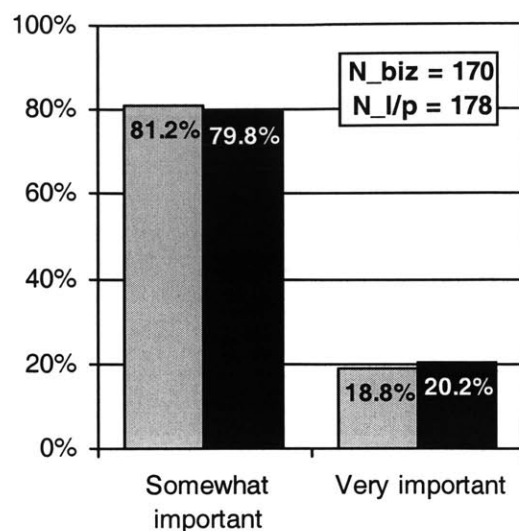


Figure B 215: (Renters) Q10 – (Privacy) Of those who rated the issue "important," the degree to which they considered it important

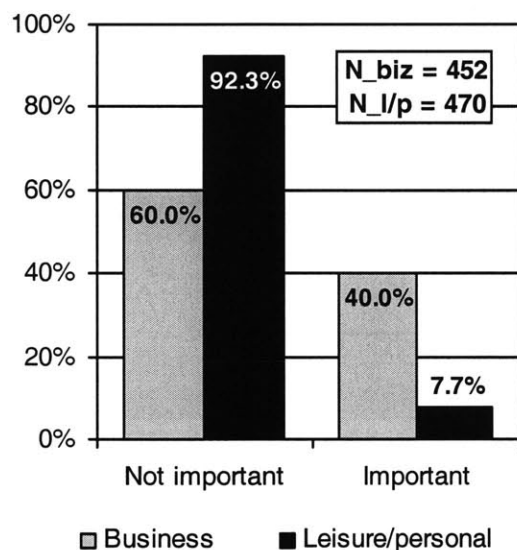


Figure B 216: (Renters) Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

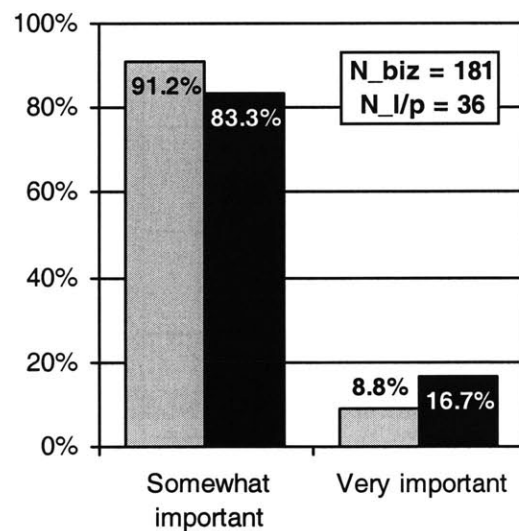


Figure B 217: (Renters) Q10 – (Conduct Business) Of those who rated the issue "important," the degree to which they considered it important

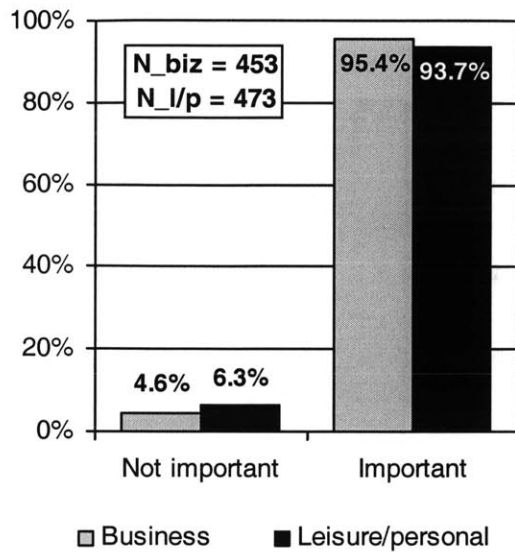


Figure B 218: (Renters) Q10 – (Mobility)
How important to you are the following
issues in choosing your mode of travel?

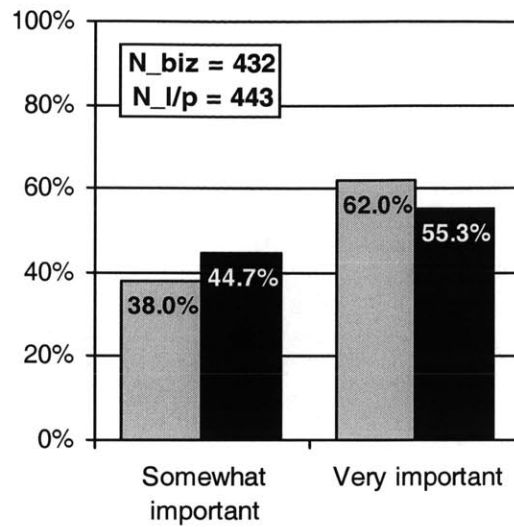


Figure B 219: (Renters) Q10 – (Mobility) Of
those who rated the issue “important,” the
degree to which they considered it
important

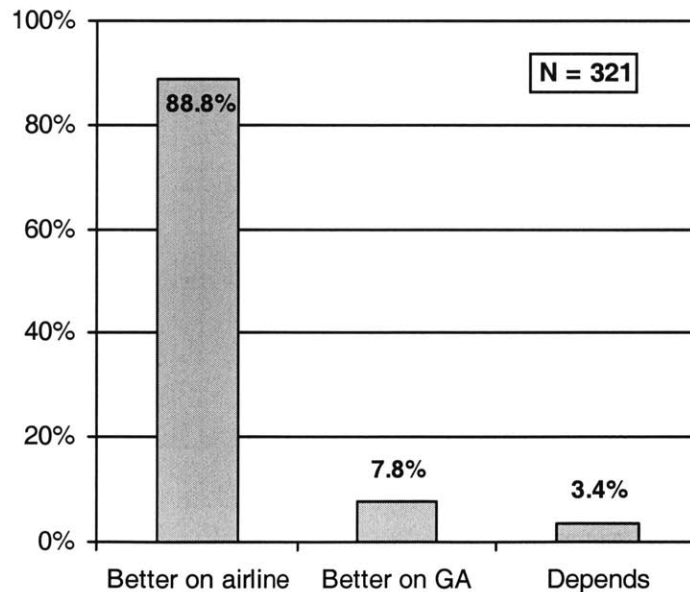


Figure B 220: (Renters) Q11 - Is your ability to conduct business or work while traveling
better on an airline than on a GA aircraft?

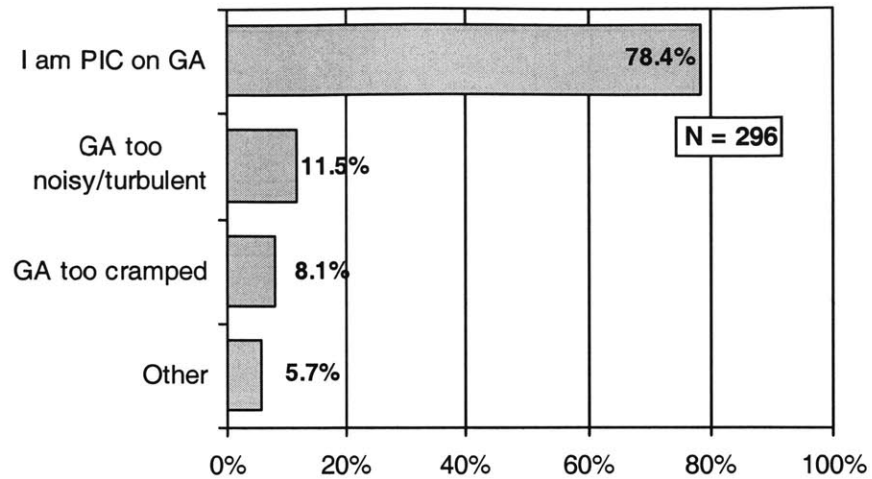


Figure B 221: (Renters) Q11 - Ability to work is better on airline because...

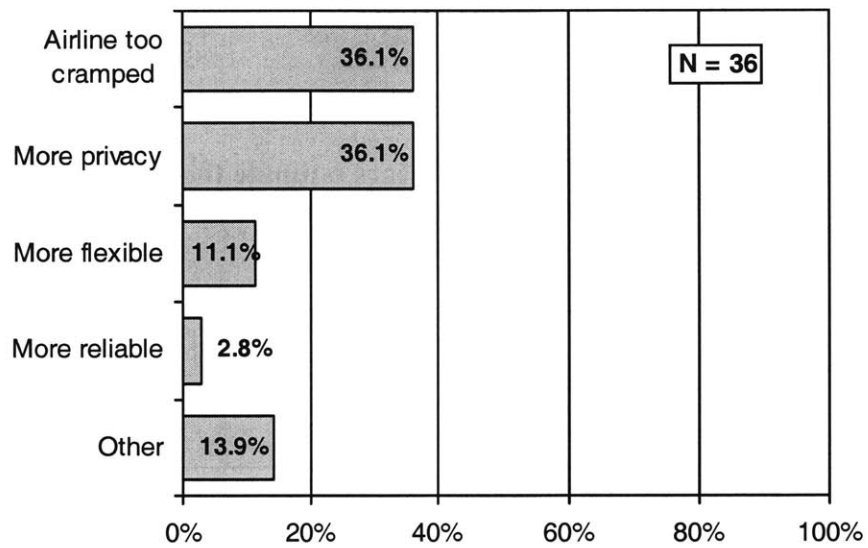


Figure B 222: (Renters) Q11 - Ability to work is better on GA because...

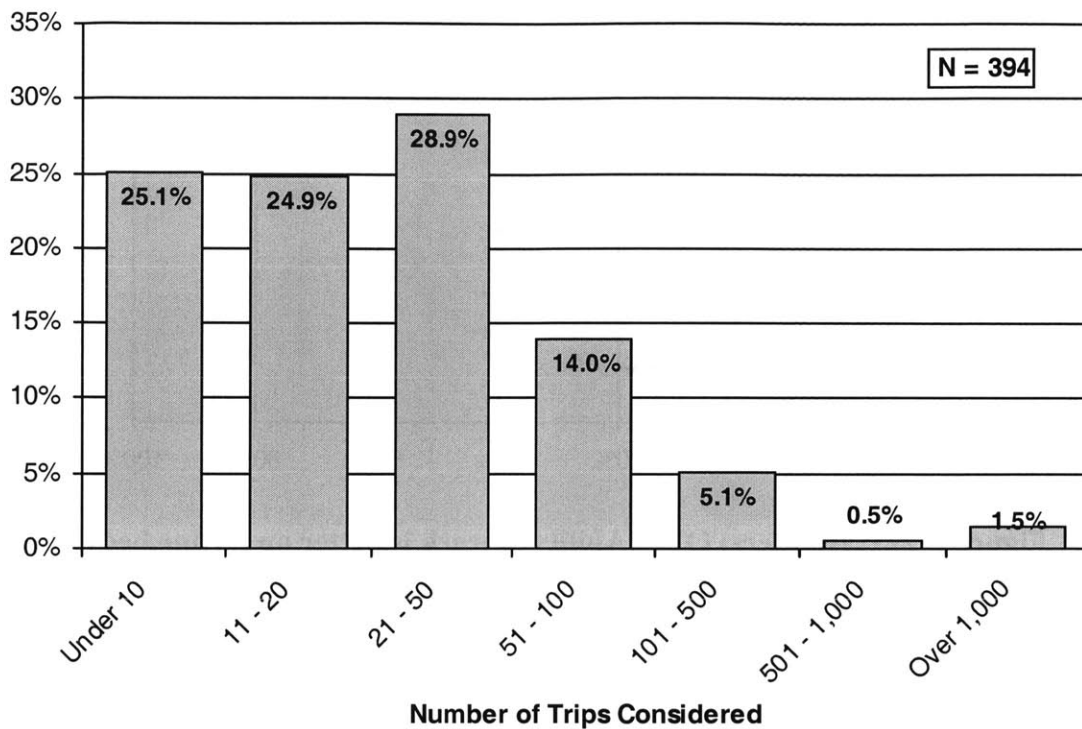


Figure B 223: (Renters) Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

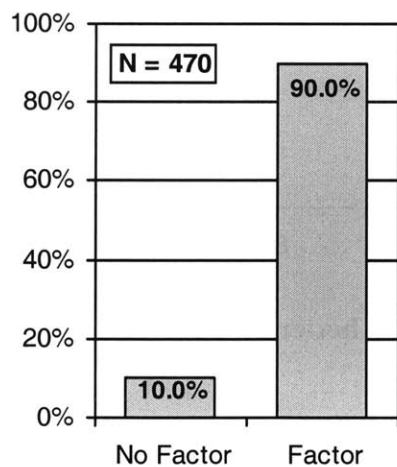


Figure B 224: (Renters) Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

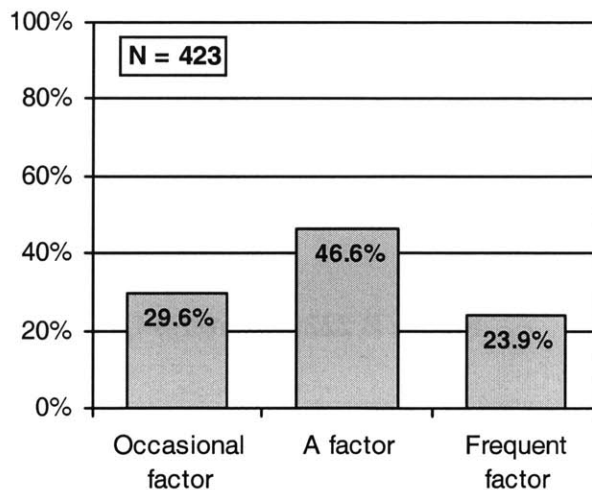


Figure B 225: (Renters) Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

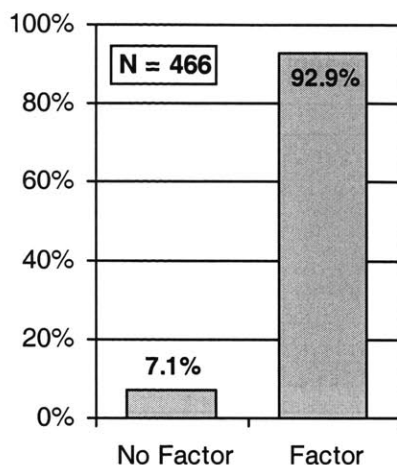


Figure B 226: (Renters) Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

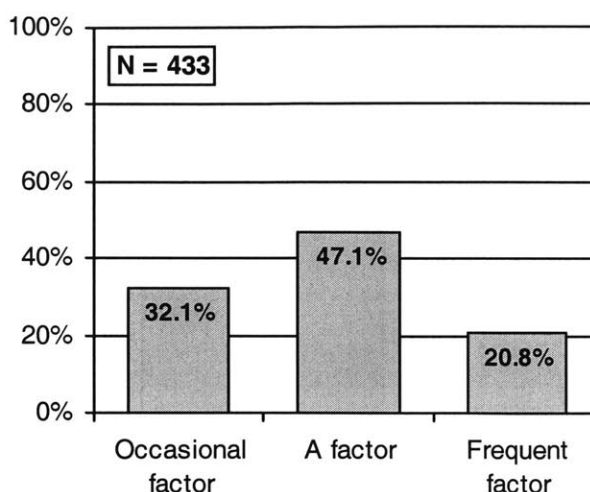


Figure B 227: (Renters) Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

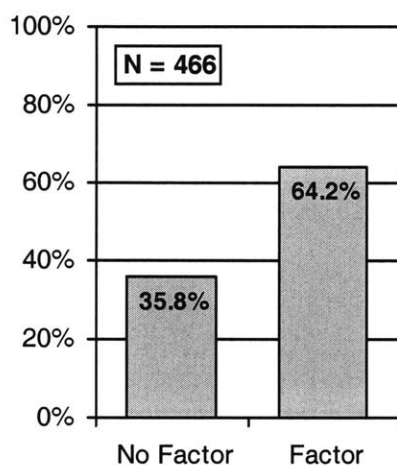


Figure B 228: (Renters) Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

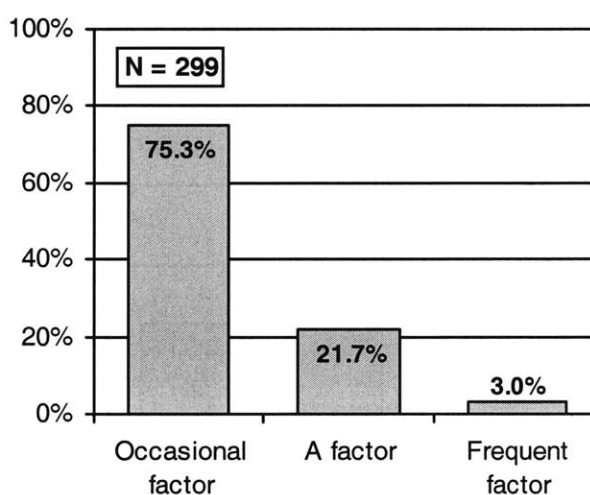


Figure B 229: (Renters) Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

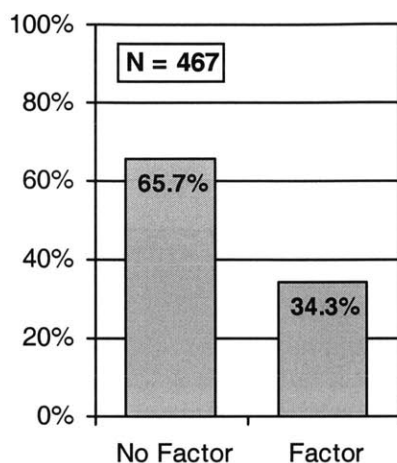


Figure B 230: (Renters) Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

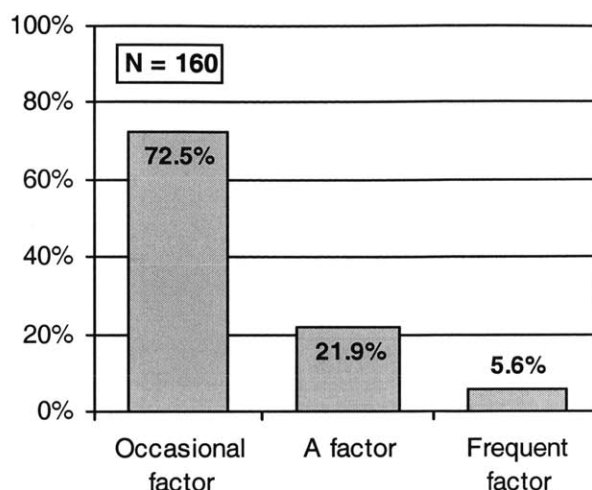


Figure B 231: (Renters) Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

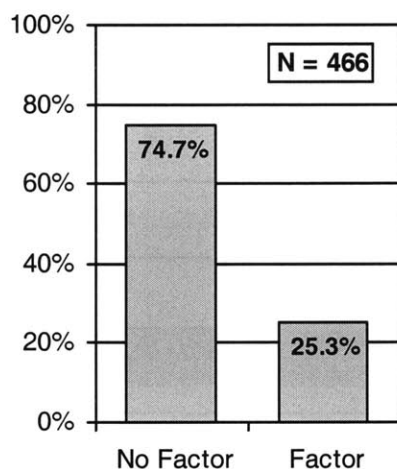


Figure B 232: (Renters) Q13 – (Not Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

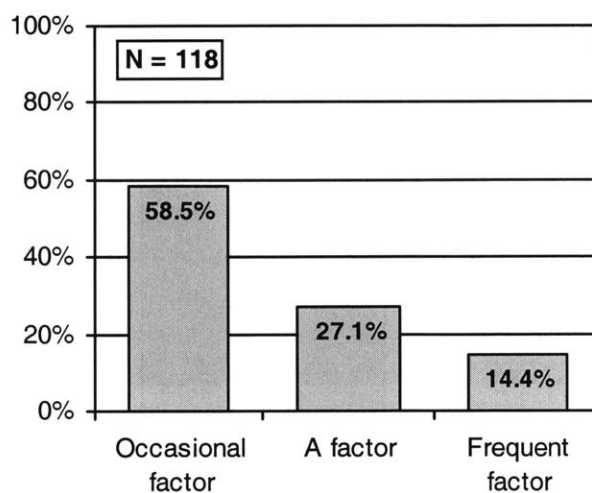


Figure B 233: (Renters) Q13 – (Not Current) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

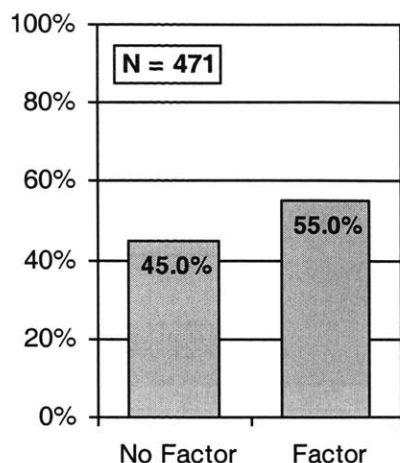


Figure B 234: (Renters) Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

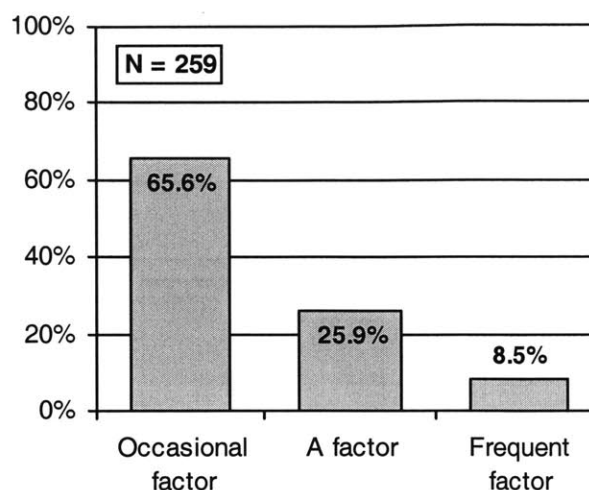


Figure B 235: (Renters) Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

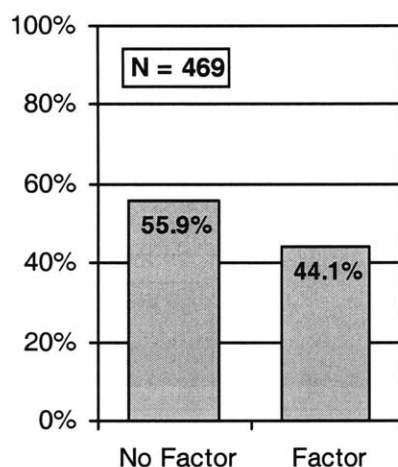


Figure B 236: (Renters) Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

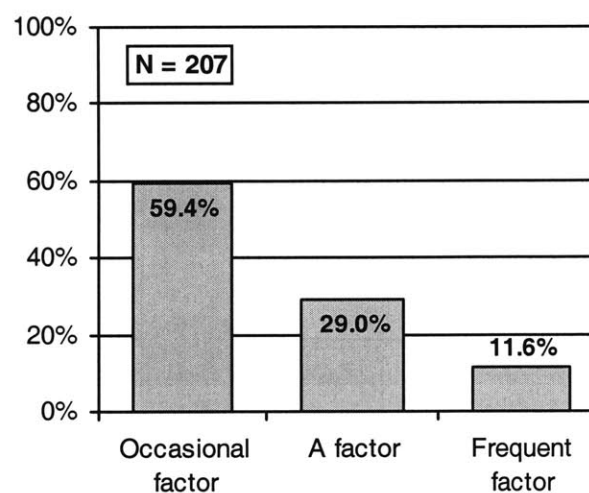


Figure B 237: (Renters) Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

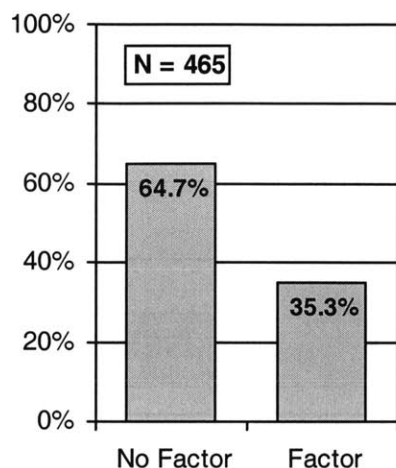


Figure B 238: (Renters) Q13 – (Comfort)
Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

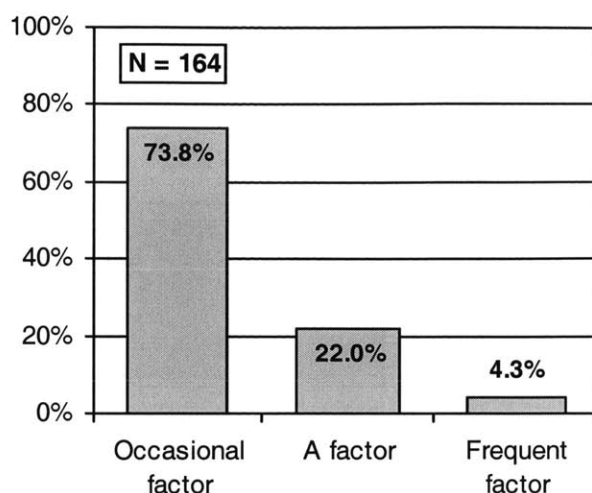


Figure B 239: (Renters) Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

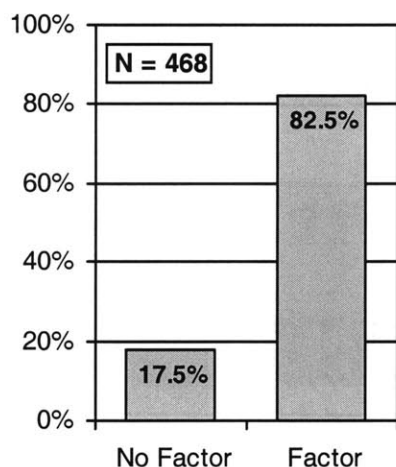


Figure B 240: (Renters) Q13 – (Scheduling)
Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

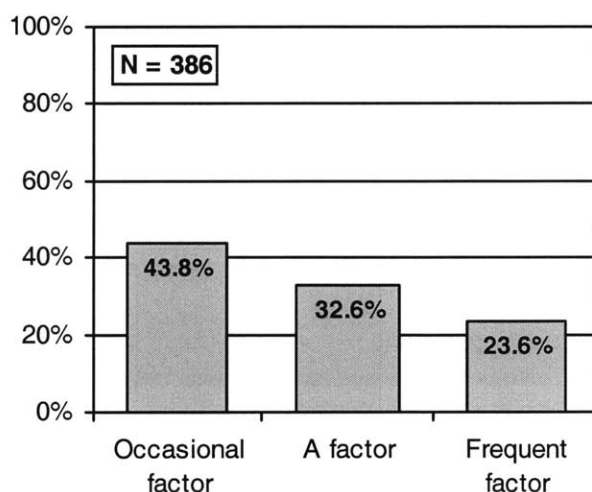


Figure B 241: (Renters) Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

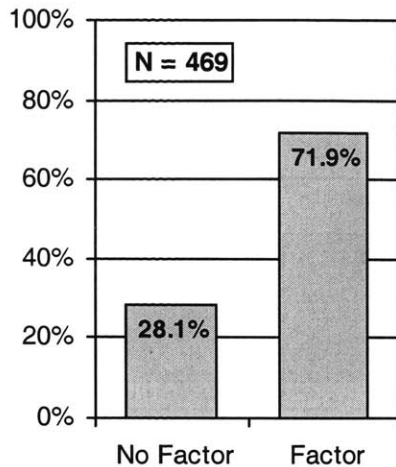


Figure B 242: (Renters) Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

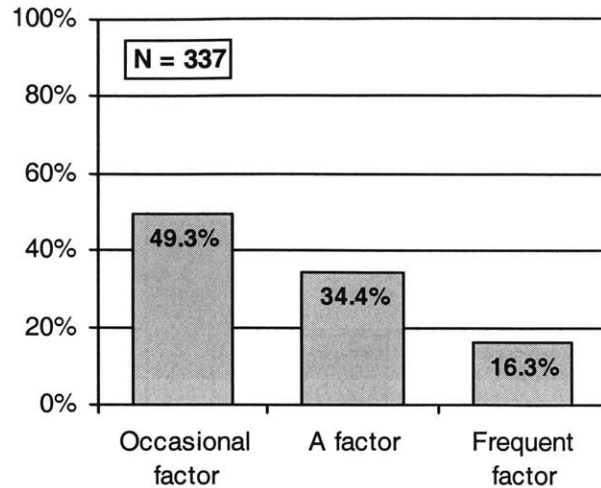


Figure B 243: (Renters) Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

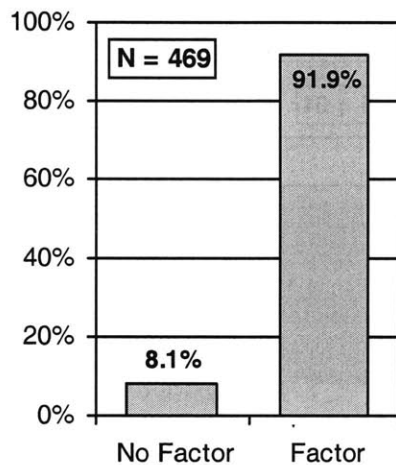


Figure B 244: (Renters) Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

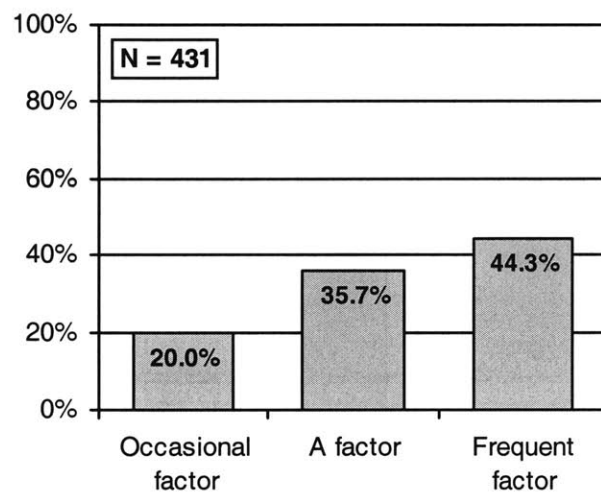


Figure B 245: (Renters) Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

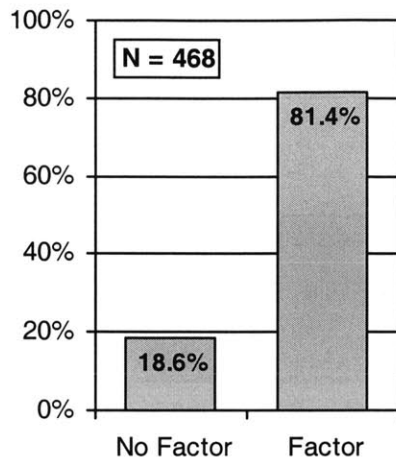


Figure B 246: (Renters) Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

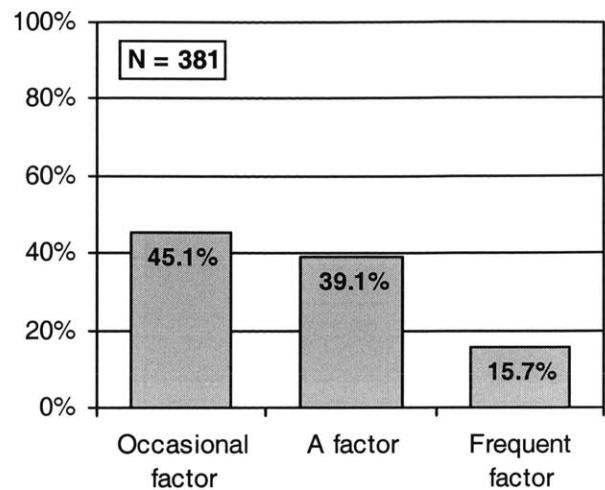


Figure B 247: (Renters) Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

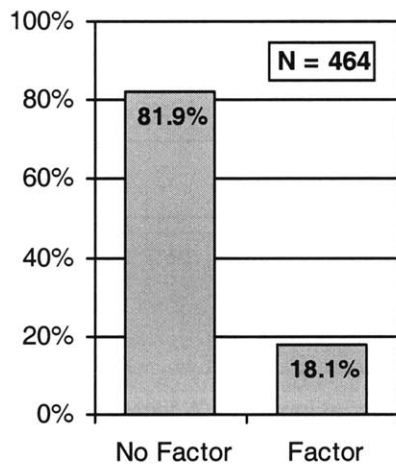


Figure B 248: (Renters) Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

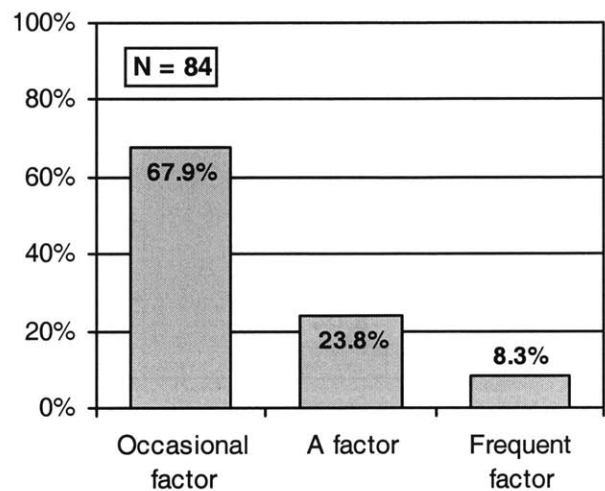


Figure B 249: (Renters) Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

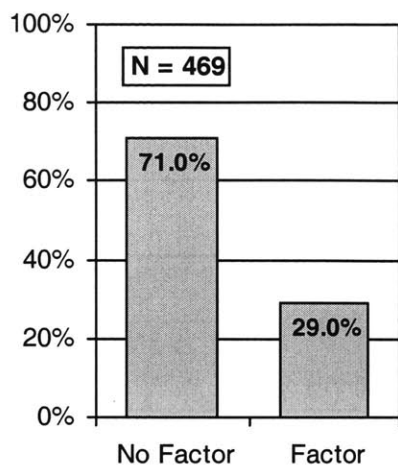


Figure B 250: (Renters) Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

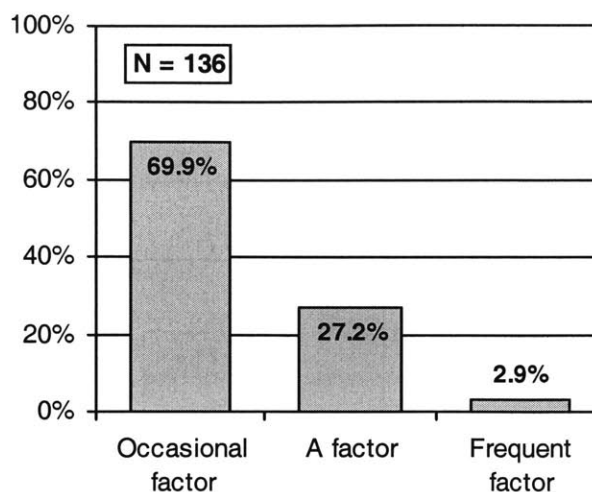


Figure B 251: (Renters) Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

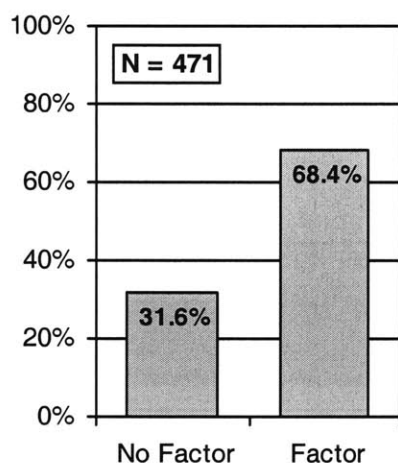


Figure B 252: (Renters) Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

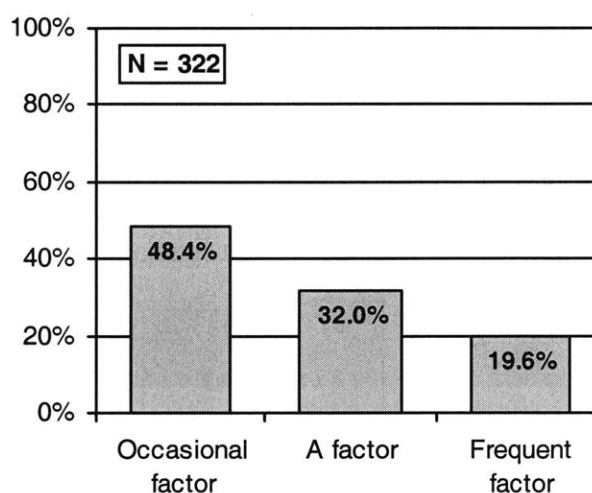


Figure B 253: (Renters) Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

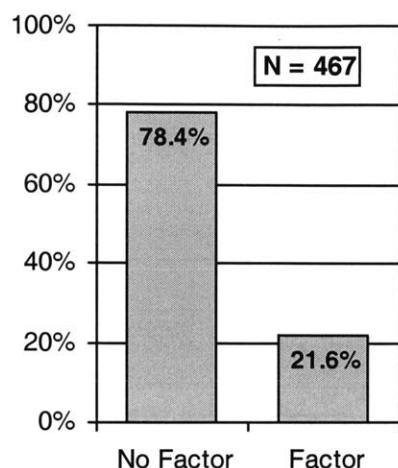


Figure B 254: (Renters) Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

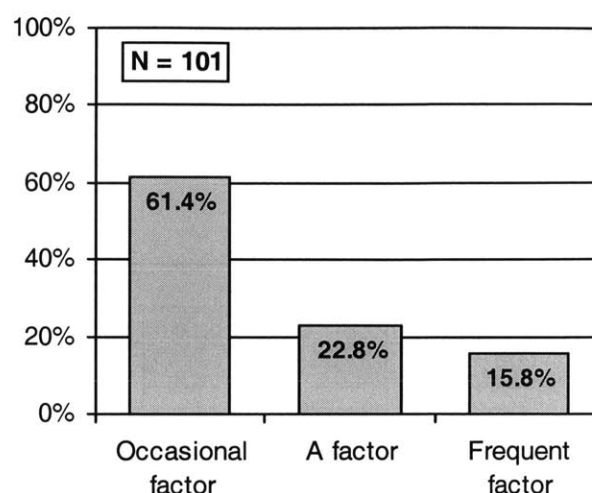


Figure B 255: (Renters) Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

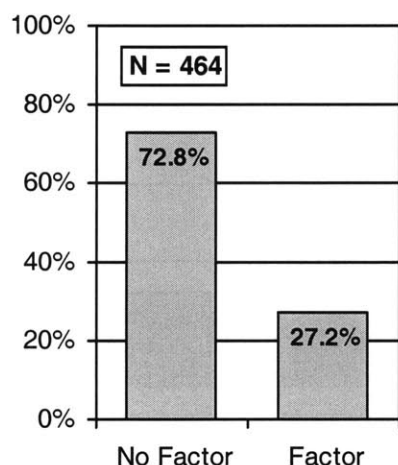


Figure B 256: (Renters) Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

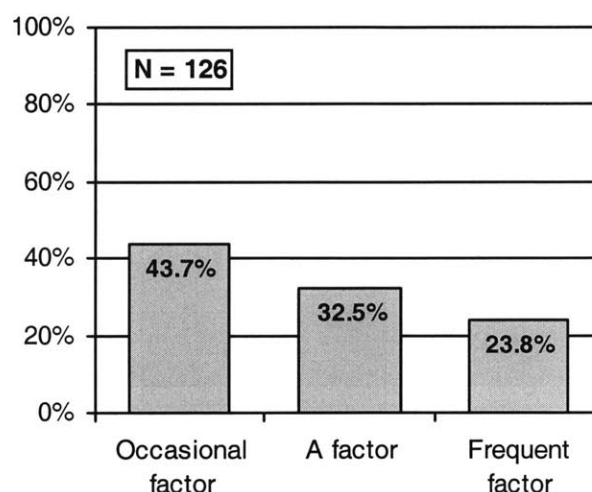


Figure B 257: (Renters) Q13 – (Insurance Costs) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

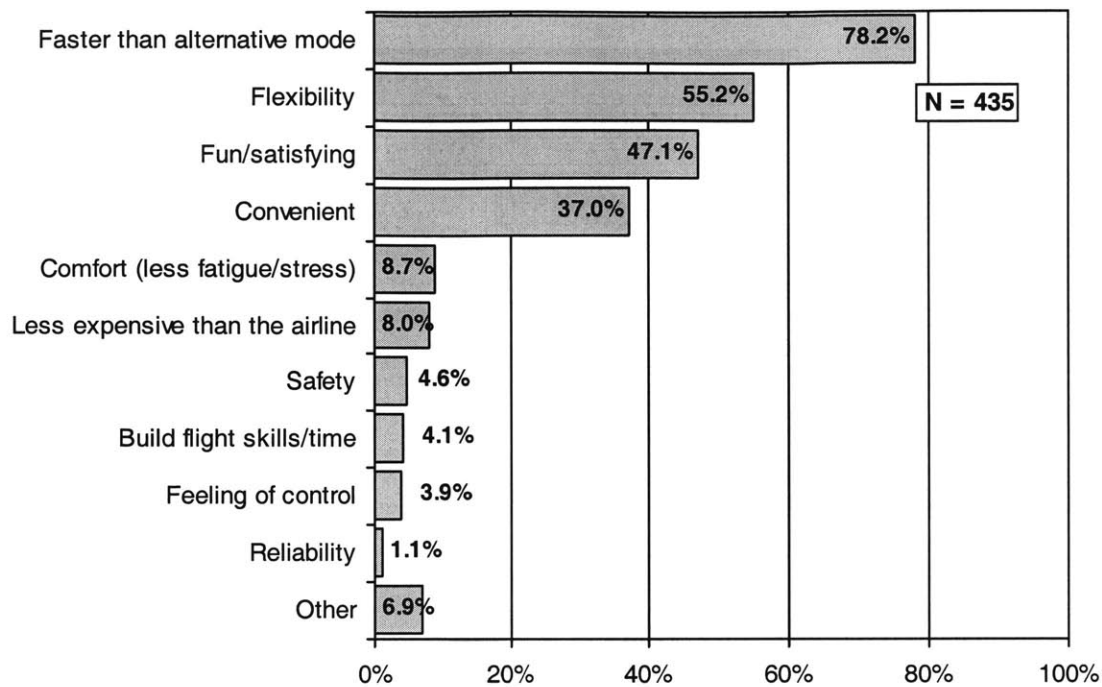


Figure B 258: (Renters) Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

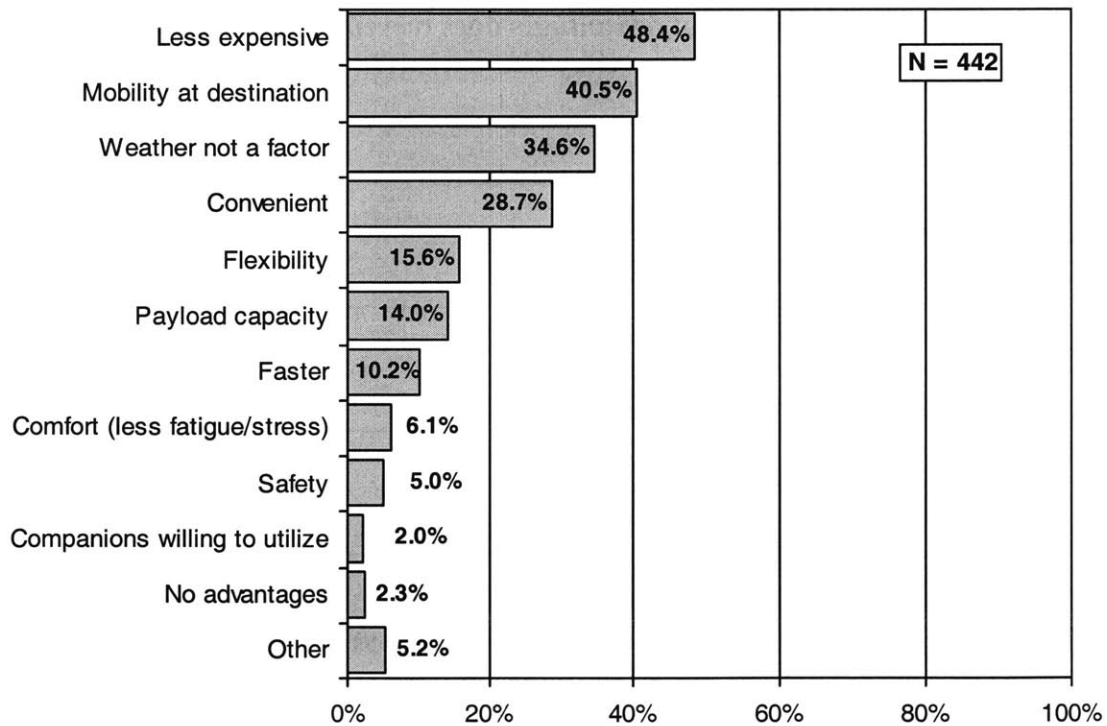


Figure B 259: (Renters) Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

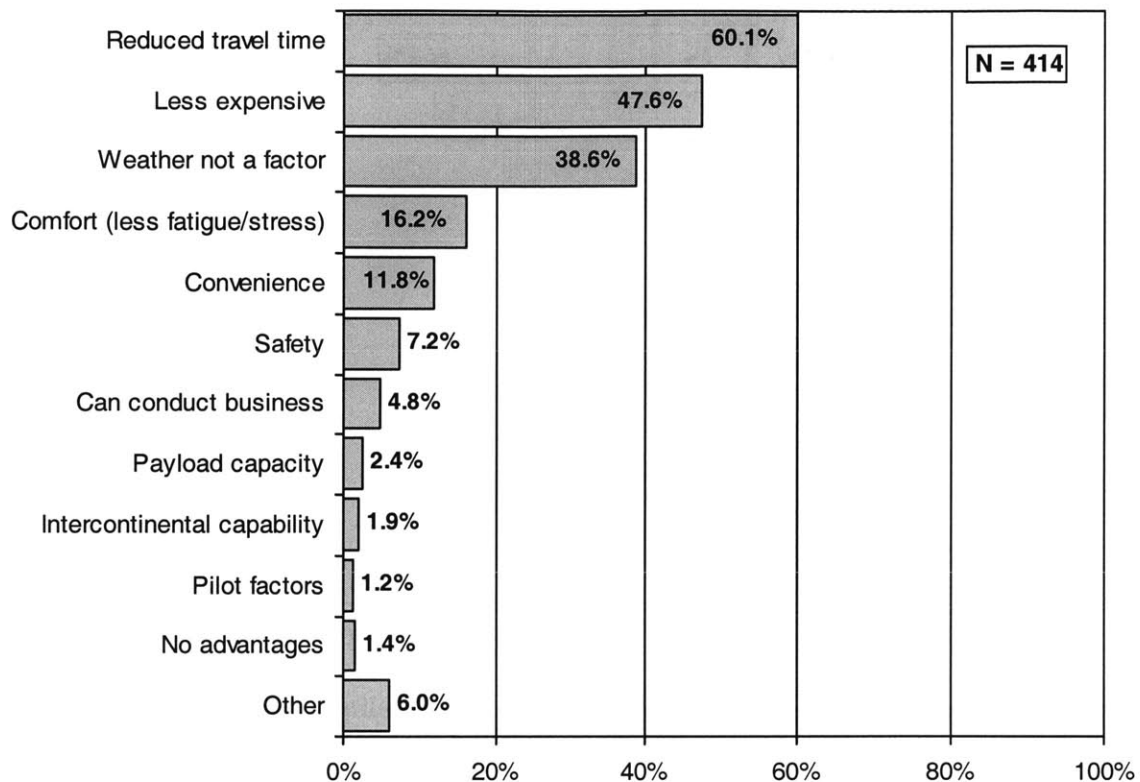


Figure B 260: (Renters) Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

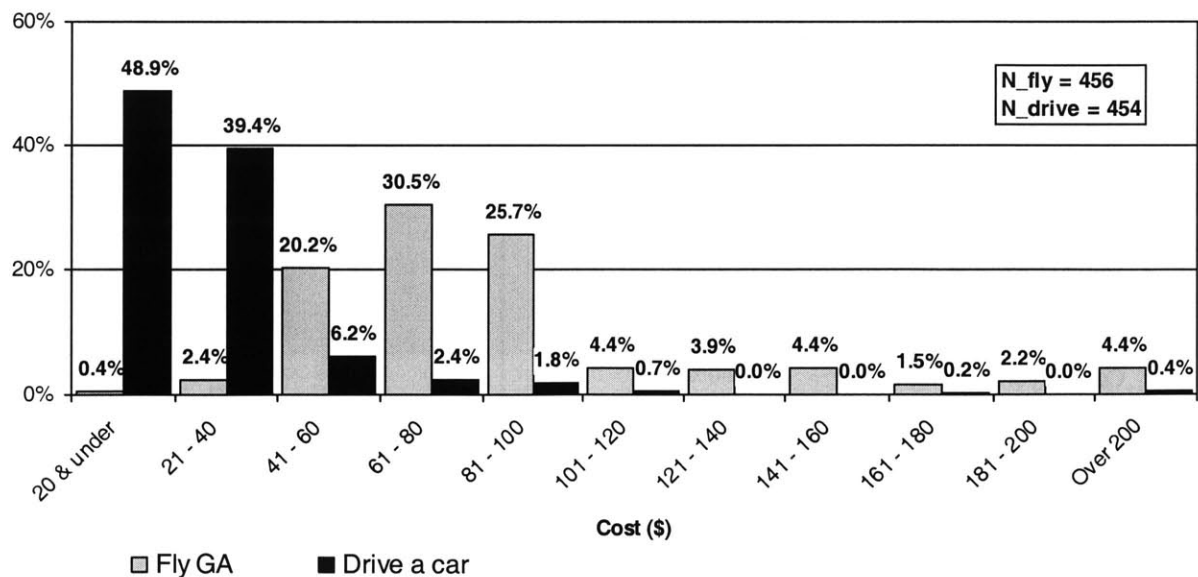


Figure B 261: (Renters) Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

(single engine aircraft only)

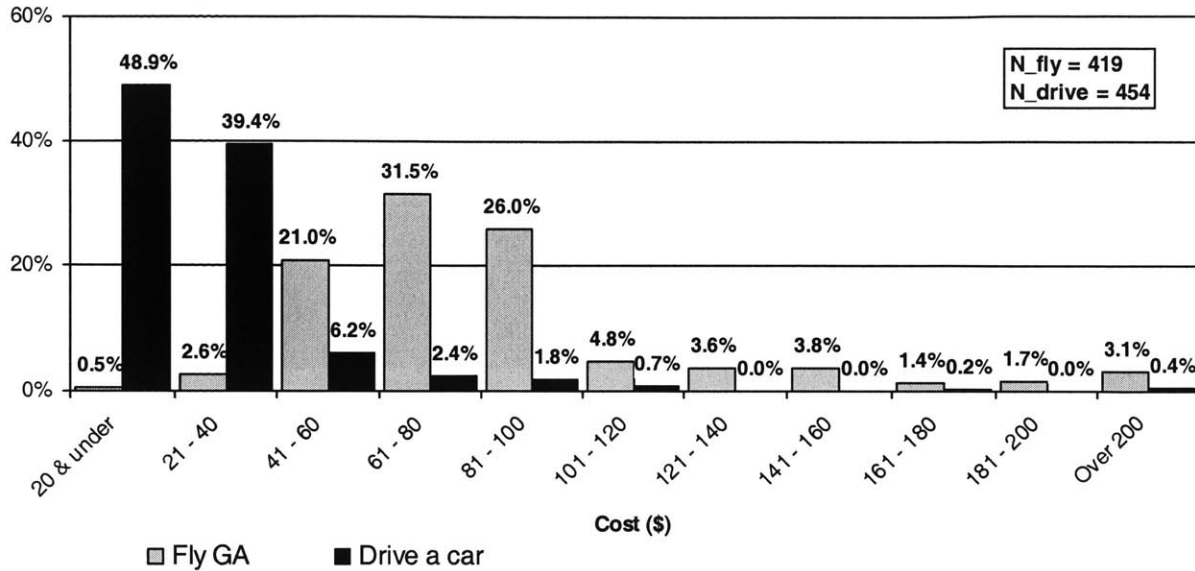


Figure B 262: (Renters) Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

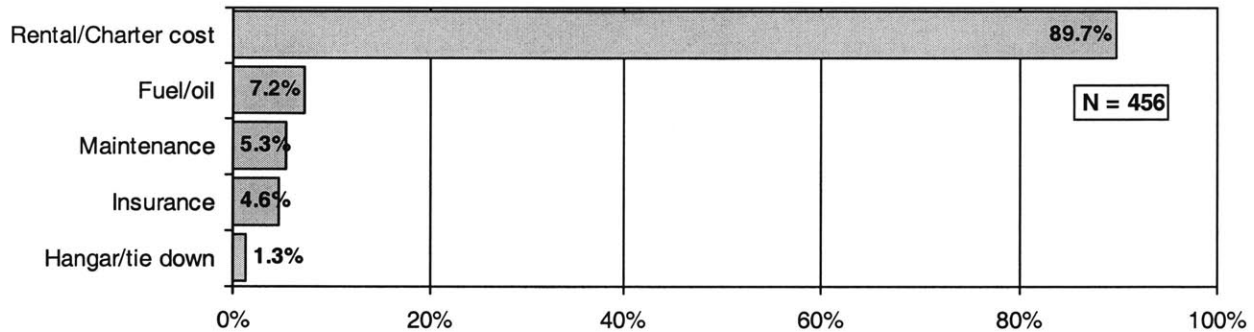


Figure B 263: (Renters) Q17 - What items create this cost to fly 100 statute miles?

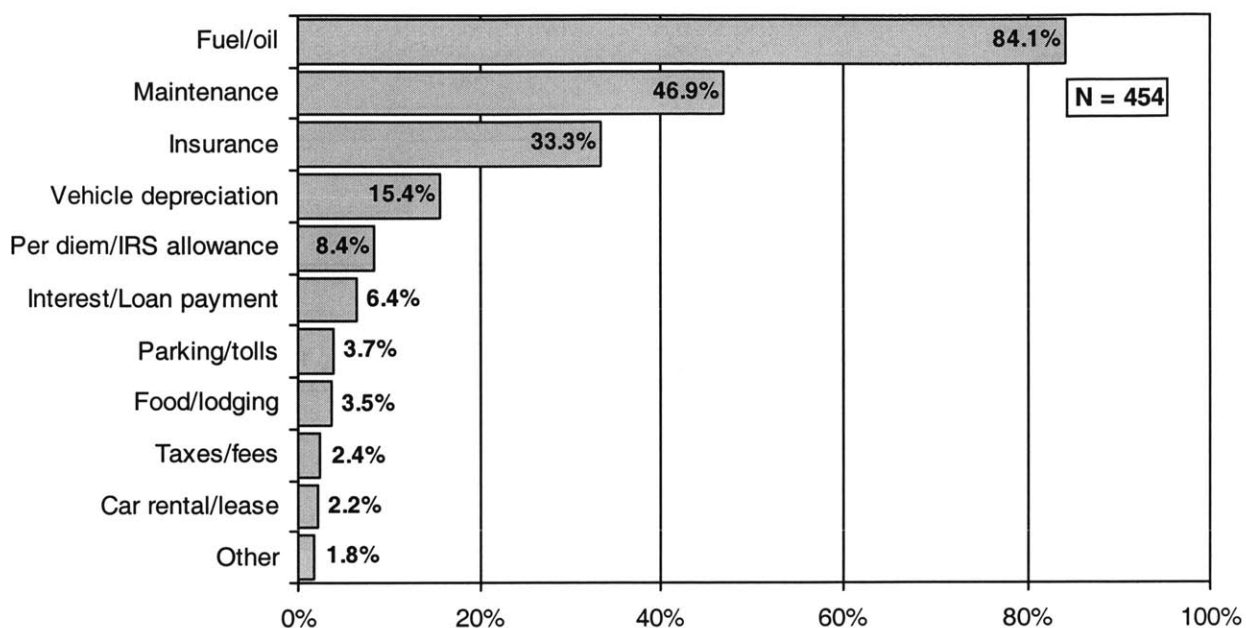


Figure B 264: (Renters) Q18 - What items create this cost to drive a car 100 statute miles?

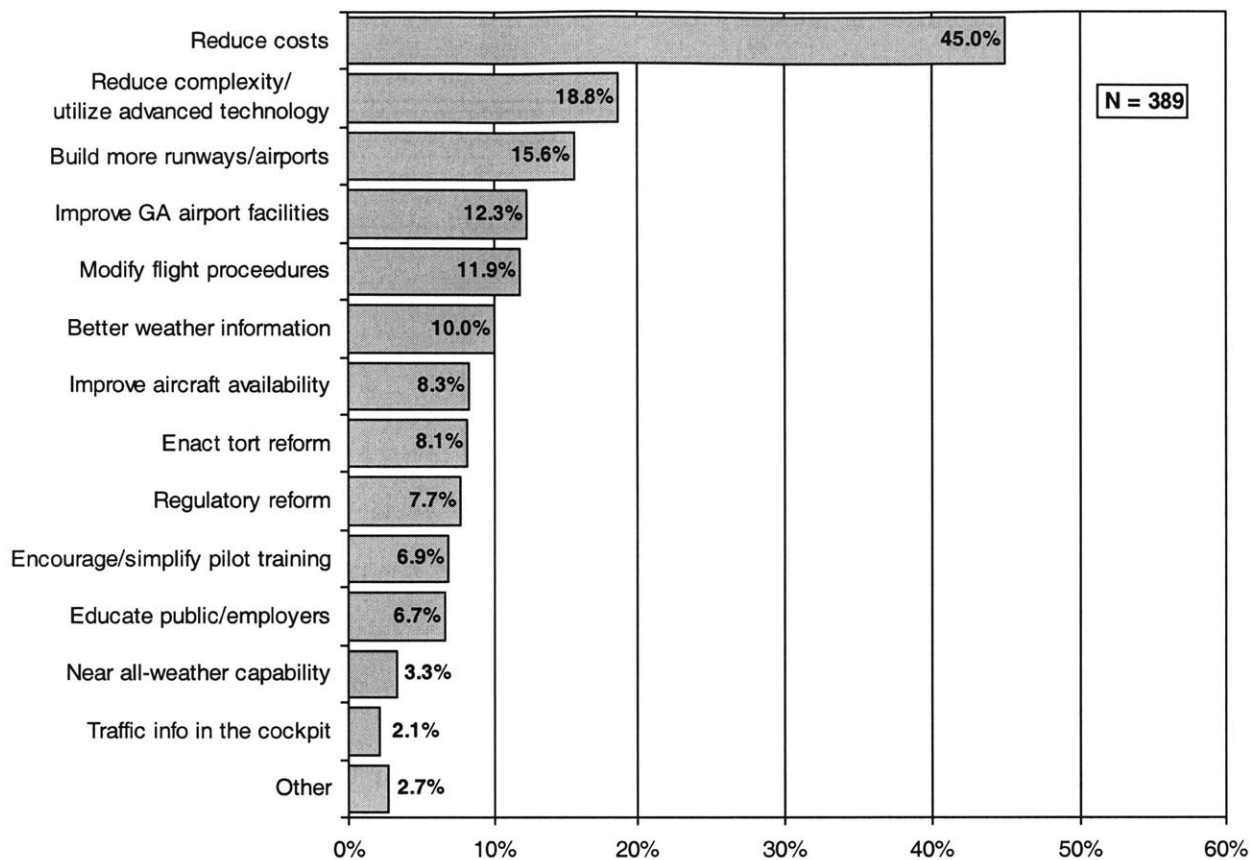


Figure B 265: (Renters) Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

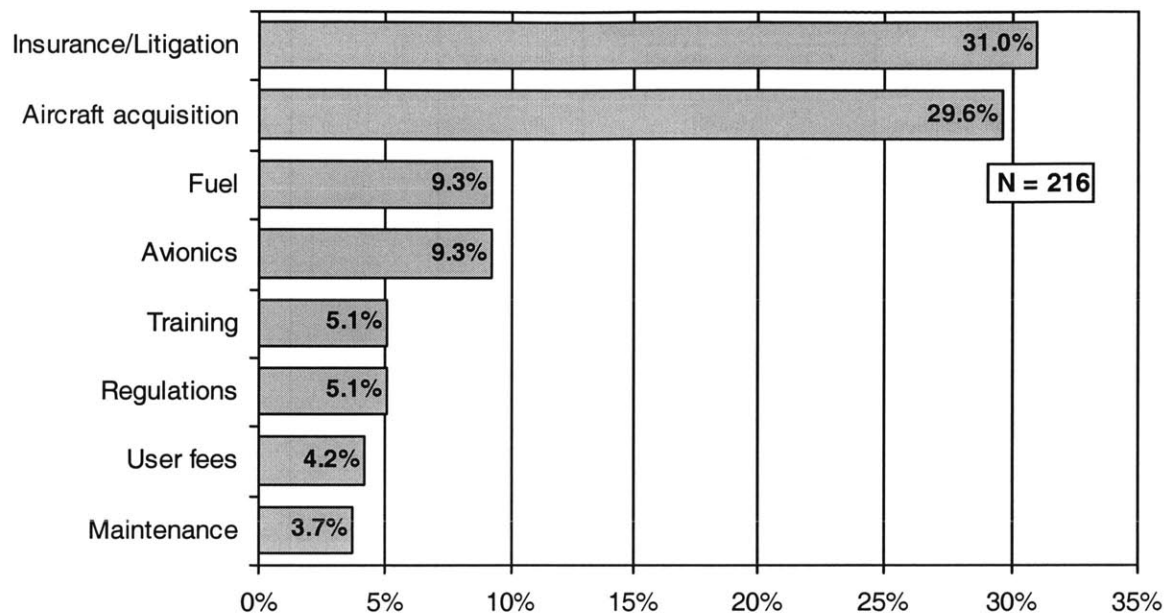


Figure B 266: (Renters) Q19 - Specific Areas Cited For Cost Reduction

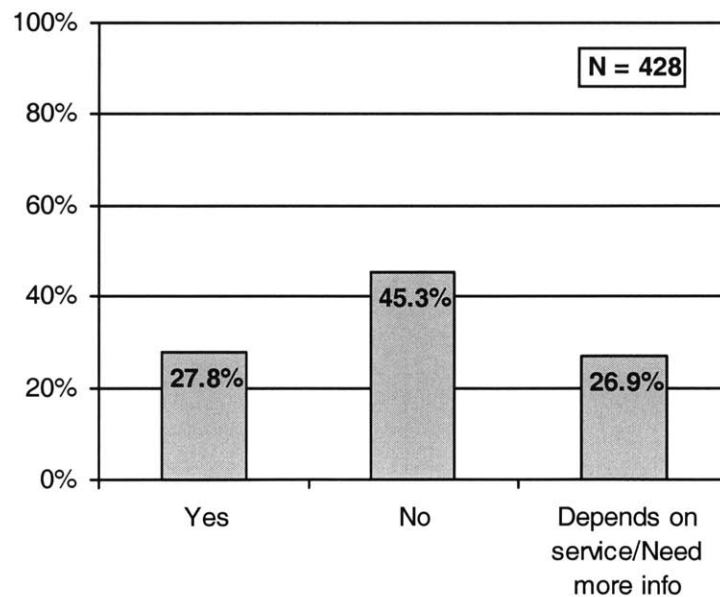


Figure B 267: (Renters) Q20 - Would Those Surveyed Use a Proposed Dispatch Service

B5 SURVEY RESULTS: HEAVY USERS OF GENERAL AVIATION

The figures in this section represent the data for only those who indicated in survey question 1 that 10+ trips were taken in the last 12 months on any GA aircraft for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Seven hundred and twenty-three (723) survey participants were categorized as “heavy GA users.” The data is presented in the order in which the questions were presented in the survey. See Appendix A for a complete copy of the survey.

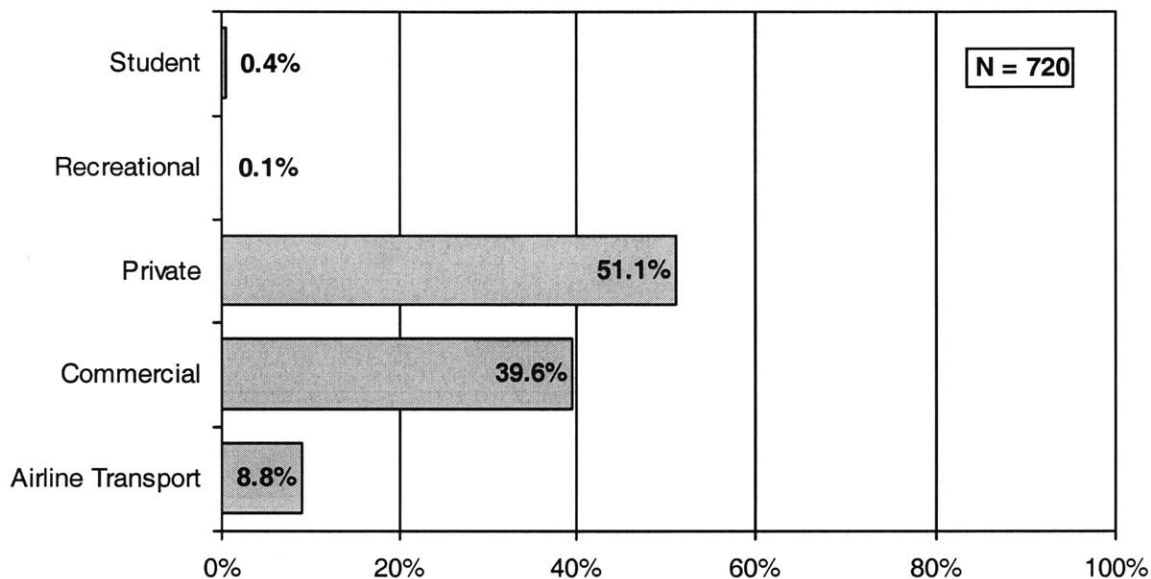


Figure B 268: (Heavy GA Users) Survey Respondents' Pilot Certificate

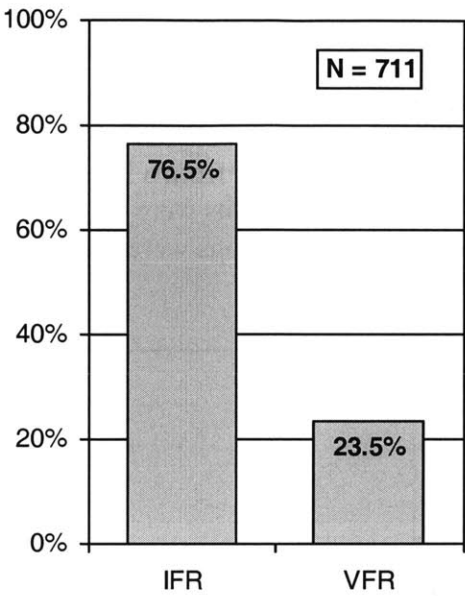


Figure B 269: (Heavy GA Users) Survey Respondents' Instrument Rating

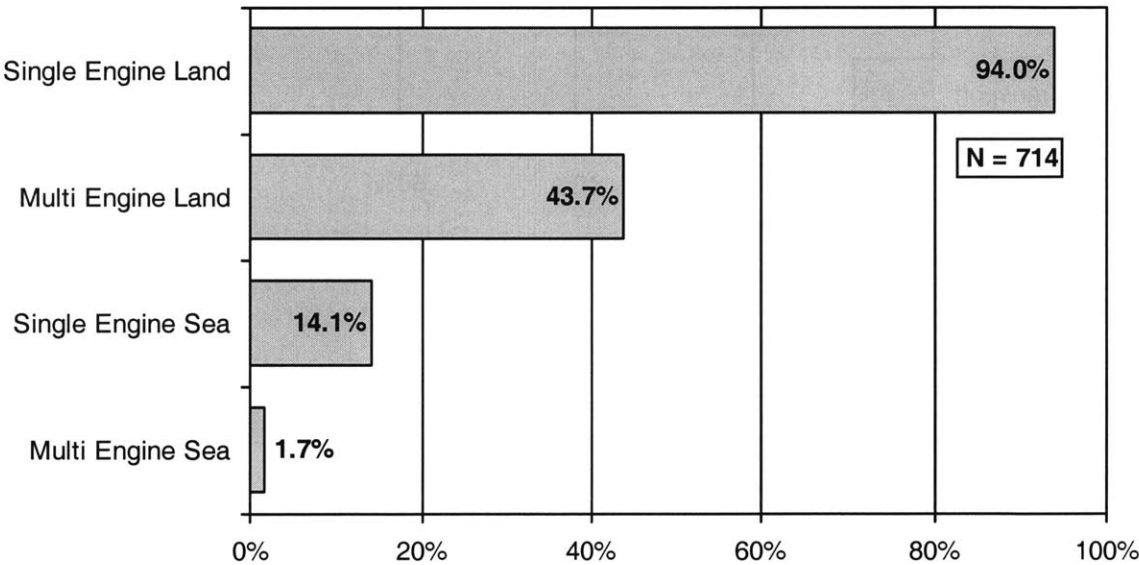


Figure B 270: (Heavy GA Users) Survey Respondents' Airplane Class Rating

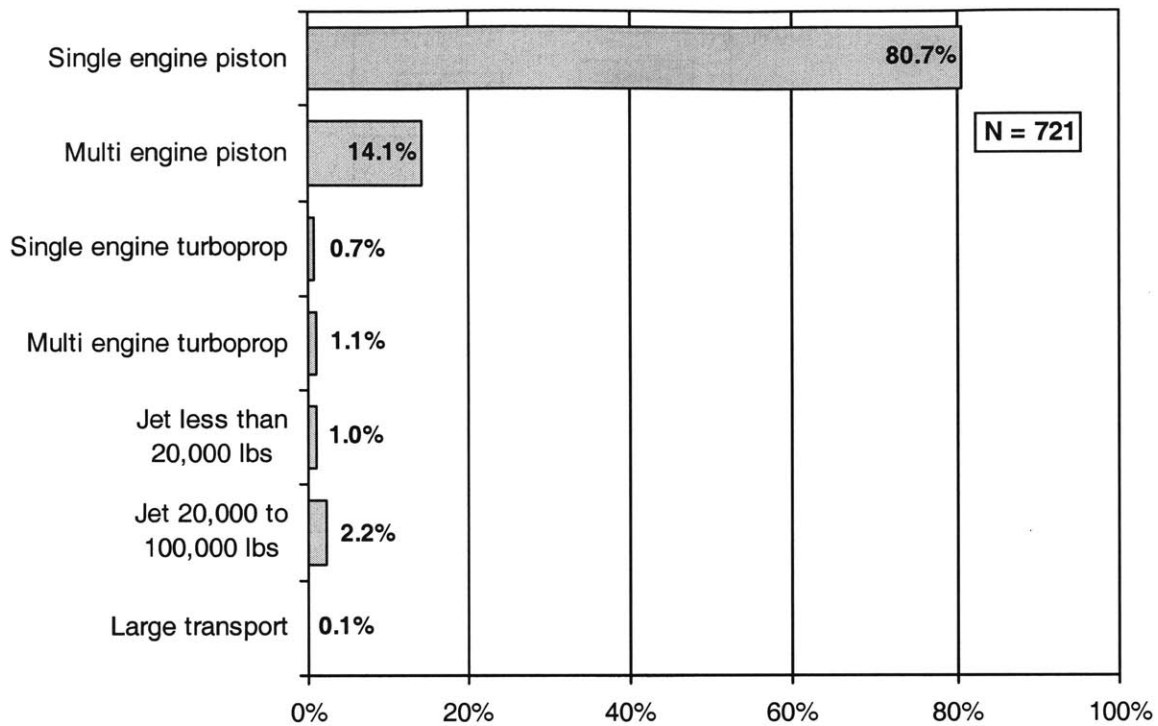


Figure B 271: (Heavy GA Users) Survey Respondents' Current Airplane Type Considered for the Survey

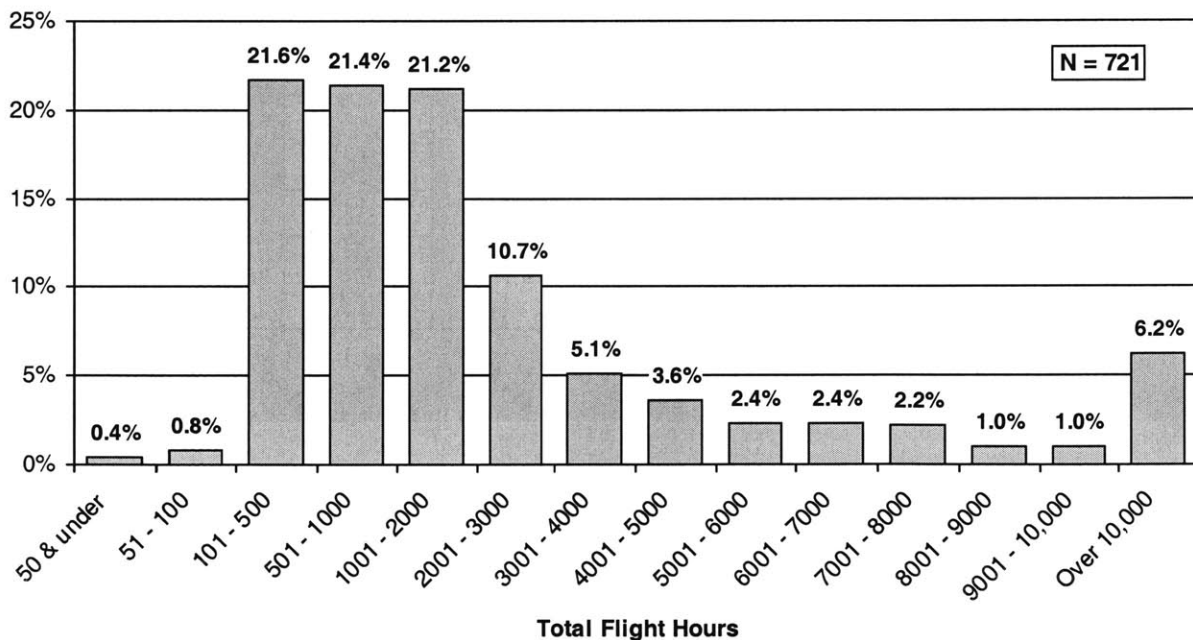


Figure B 272: (Heavy GA Users) Survey Respondents' Total Flight Hours

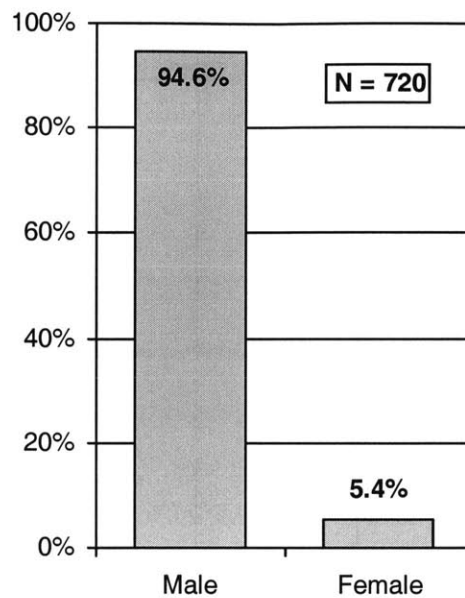


Figure B 273: (Heavy GA Users) Survey Respondents' Gender

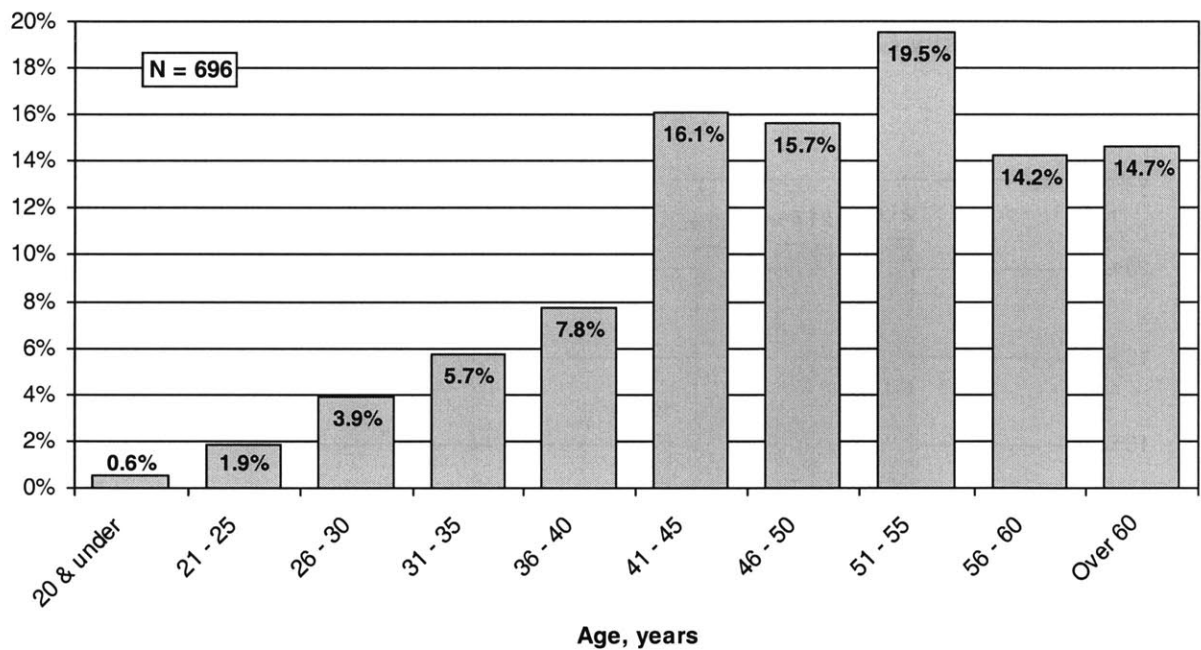


Figure B 274: (Heavy GA Users) Survey Respondents' Age

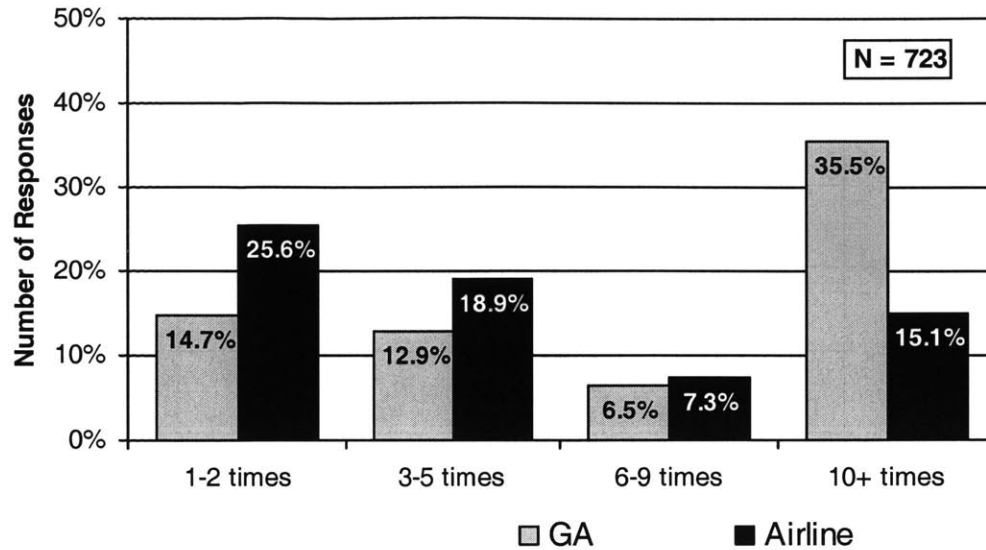


Figure B 275: (Heavy GA Users) Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

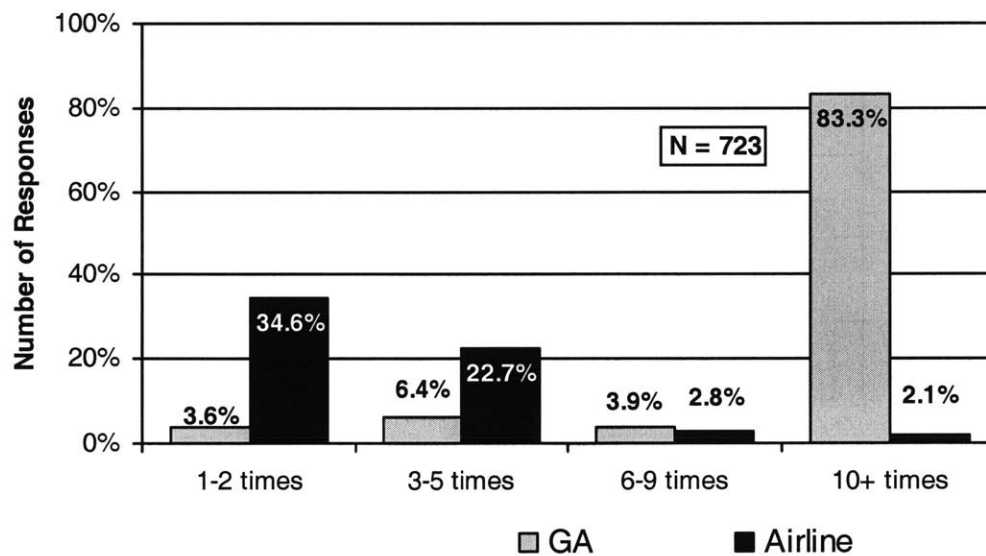


Figure B 276: (Heavy GA Users) Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

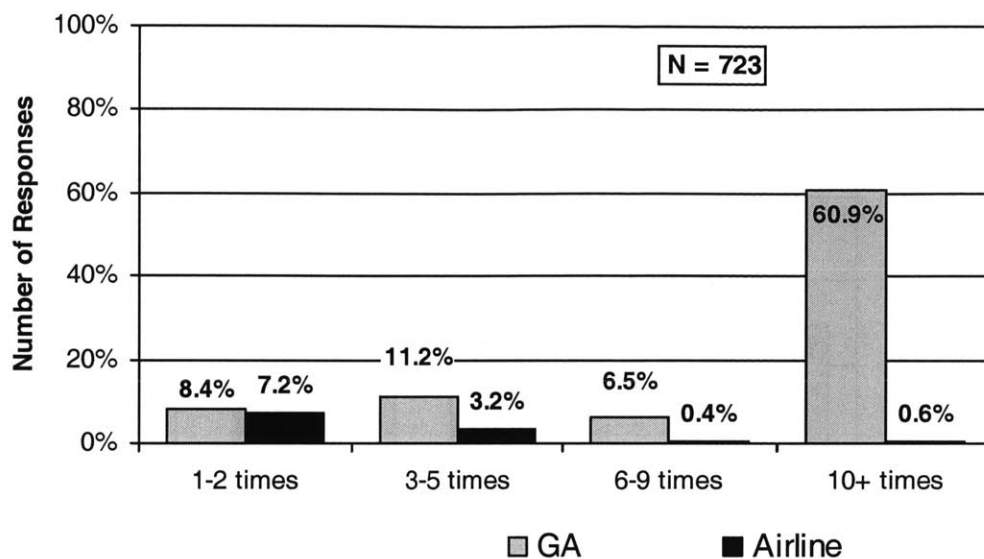


Figure B 277: (Heavy GA Users) Q1 & Q2 - Trips Taken For Pure Recreation

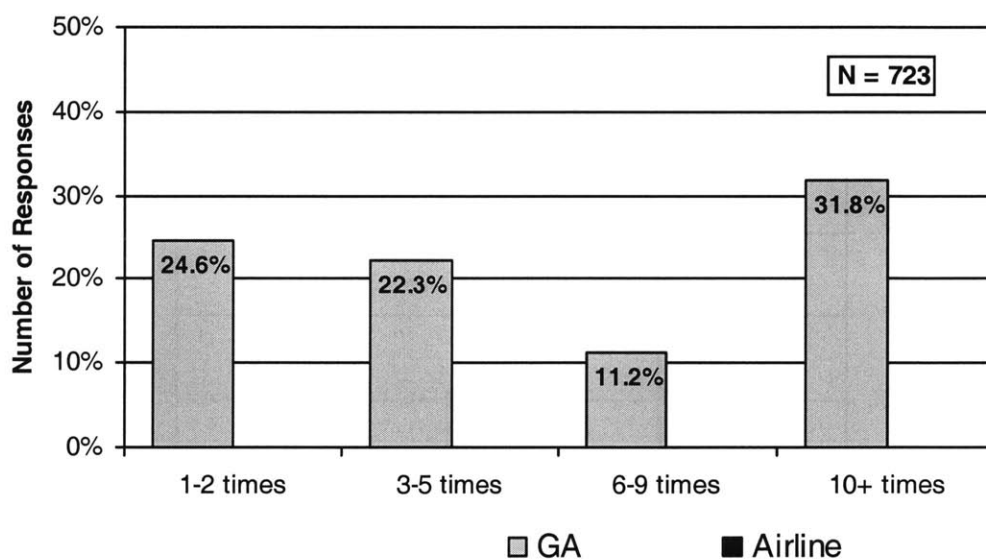


Figure B 278: (Heavy GA Users) Q1 & Q2 - Trips Taken For Training

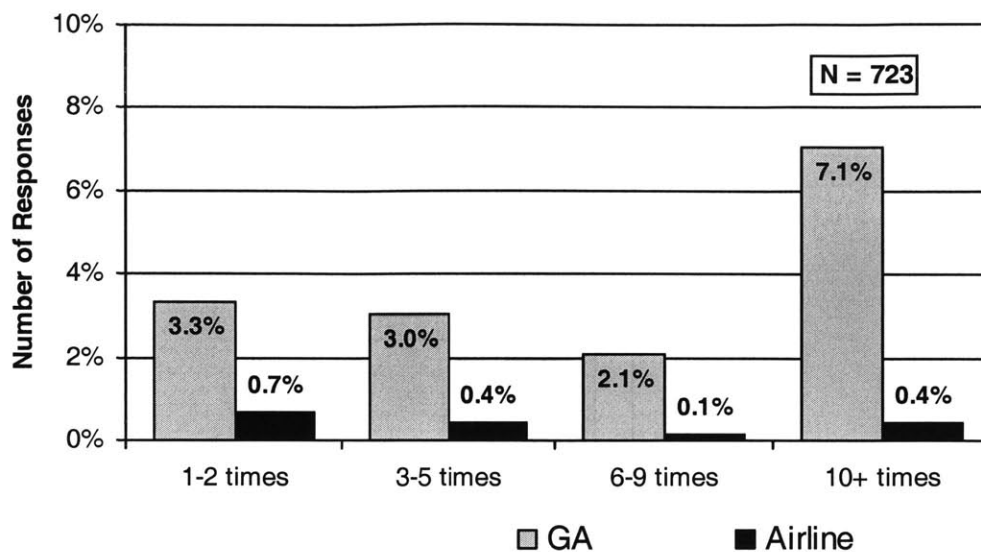


Figure B 279: (Heavy GA Users) Q1 & Q2 - Trips Taken For Other Purposes

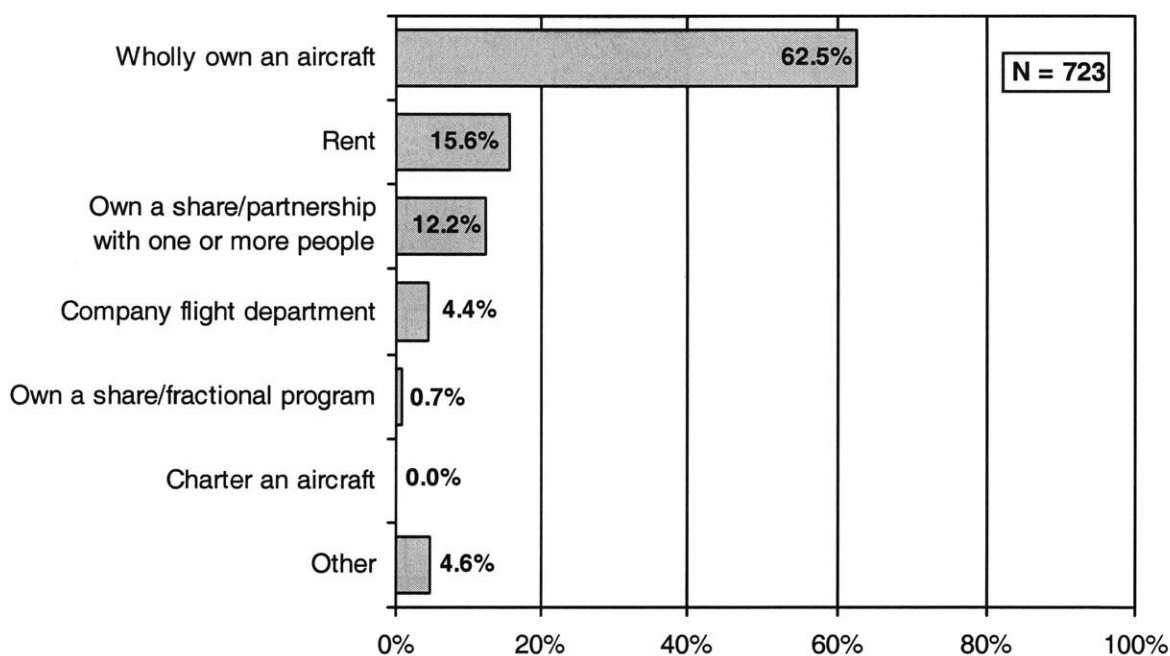


Figure B 280: (Heavy GA Users) Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

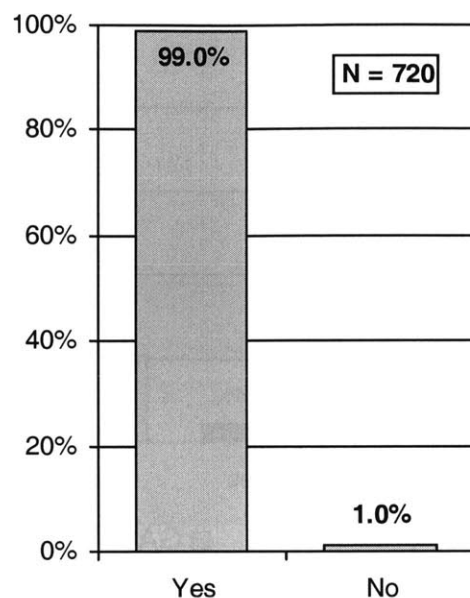


Figure B 281: (Heavy GA Users) Q4 - When you fly on GA aircraft are you typically the pilot in command?

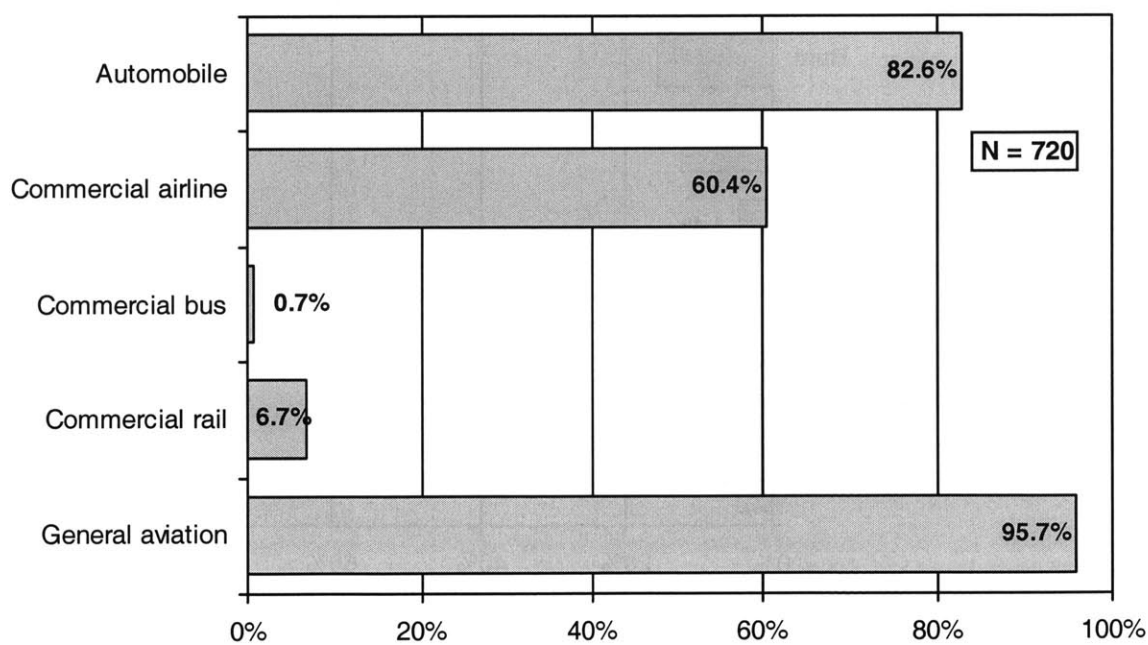


Figure B 282: (Heavy GA Users) Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

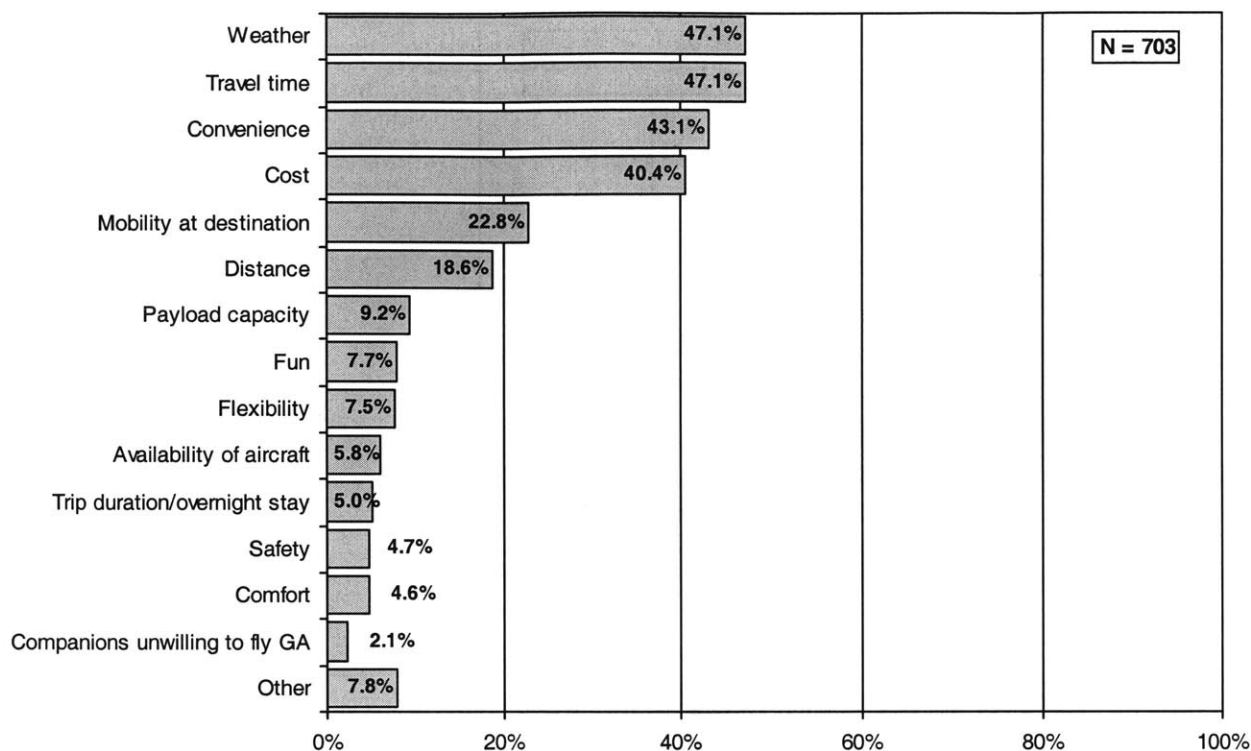


Figure B 283: (Heavy GA Users) Q6 - What factors are your major considerations in choosing among the various modes of transportation?

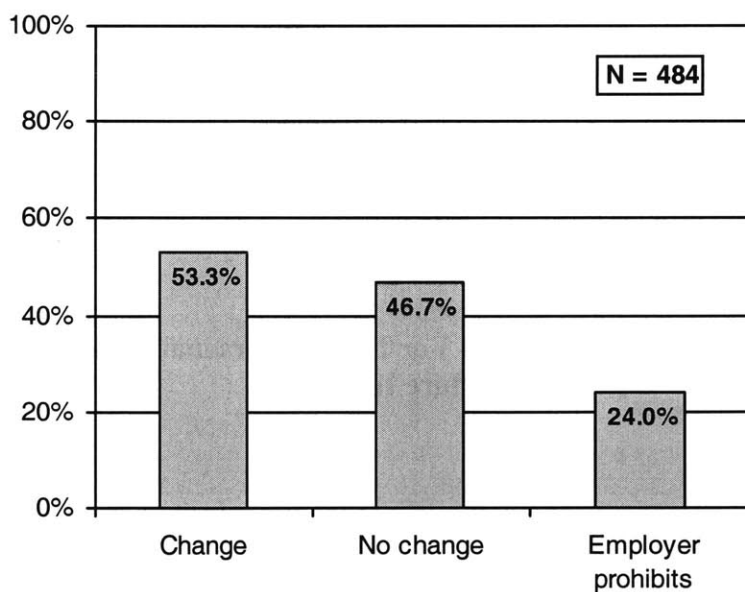


Figure B 284: (Heavy GA Users) Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

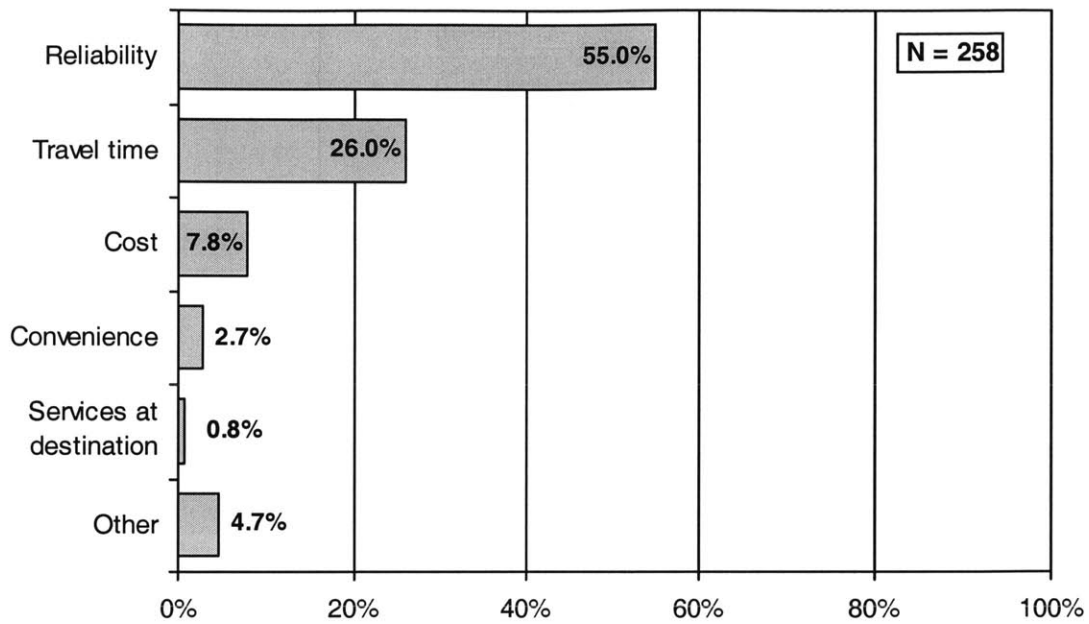


Figure B 285: (Heavy GA Users) Q7 - For Business Trips: Factors That Become More Important

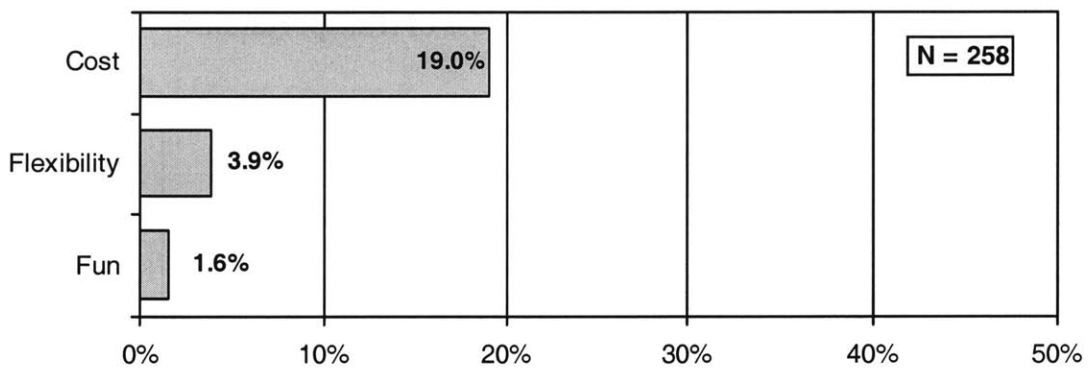


Figure B 286: (Heavy GA Users) Q7 - For Leisure/Personal Trips: Factors That Become More Important

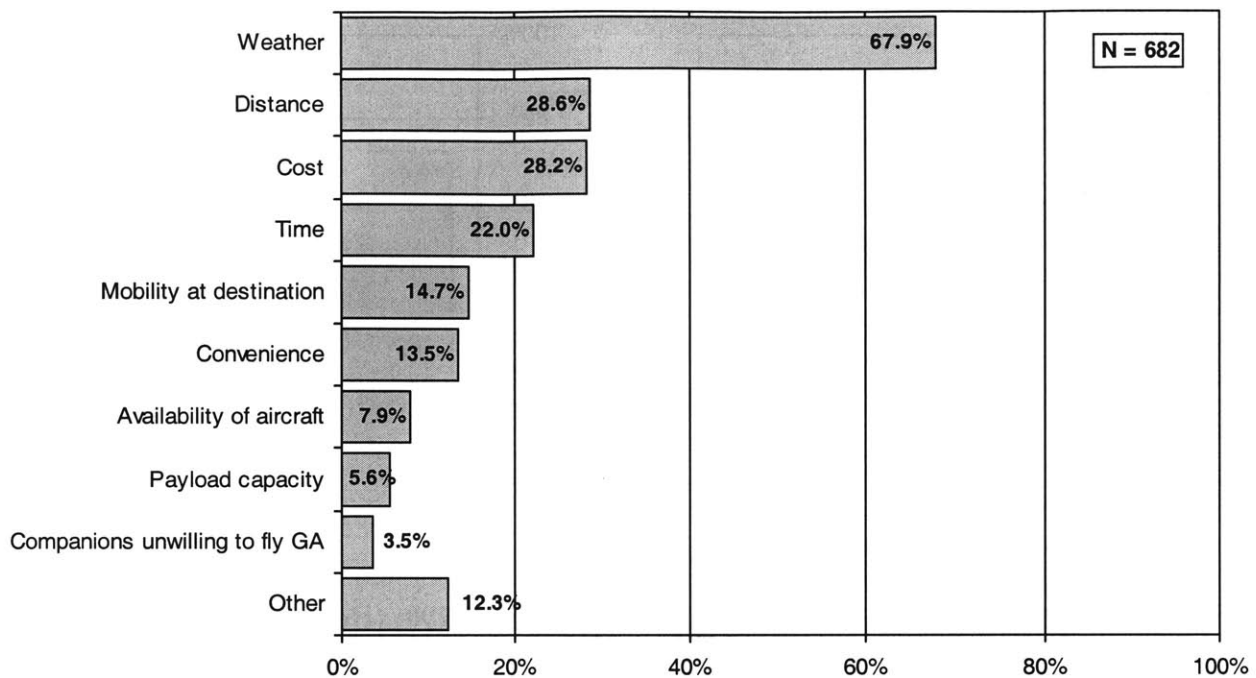


Figure B 287: (Heavy GA Users) Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

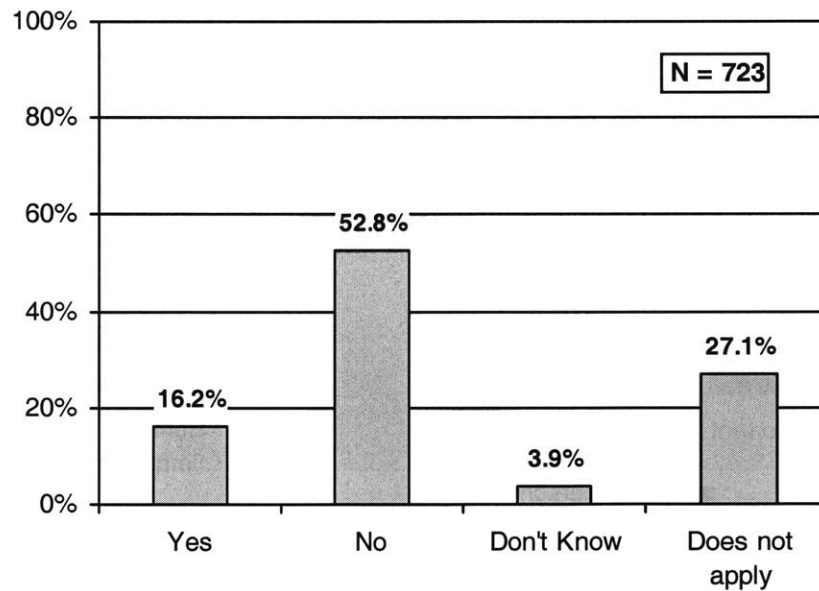


Figure B 288: (Heavy GA Users) Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

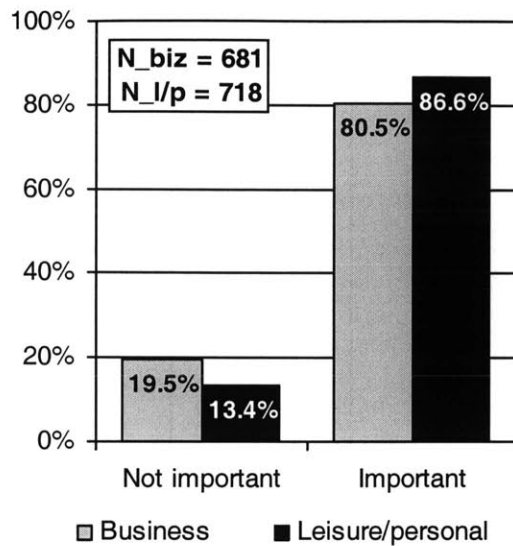


Figure B 289: (Heavy GA Users) Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

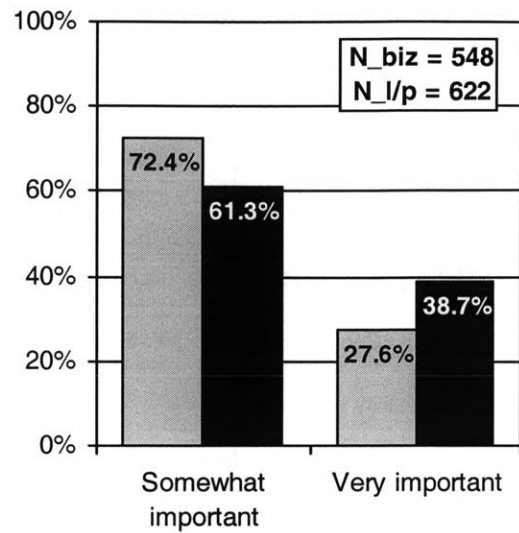


Figure B 290: (Heavy GA Users) Q10 – (Expense) Of those who rated the issue “important,” the degree to which they considered it important

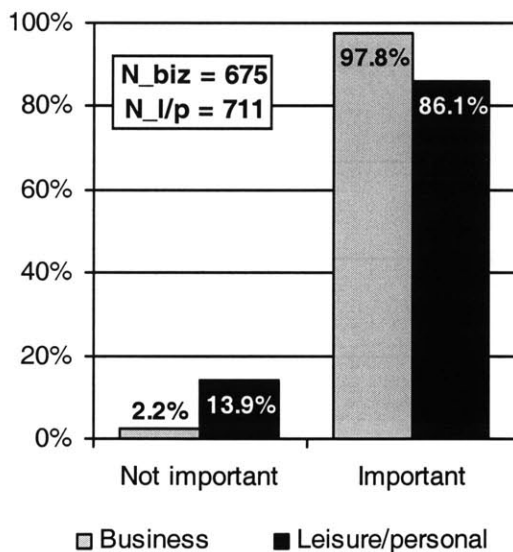


Figure B 291: (Heavy GA Users) Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

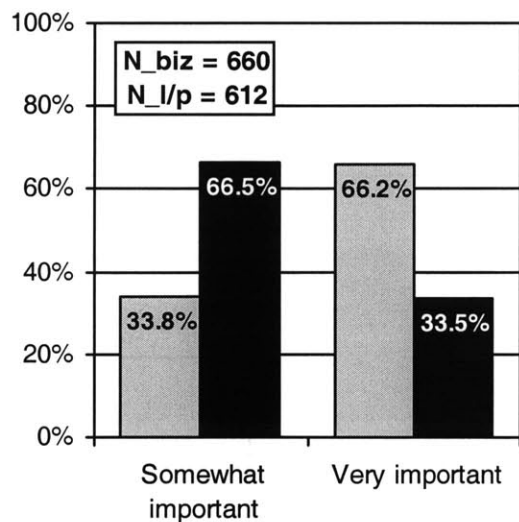


Figure B 292: (Heavy GA Users) Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

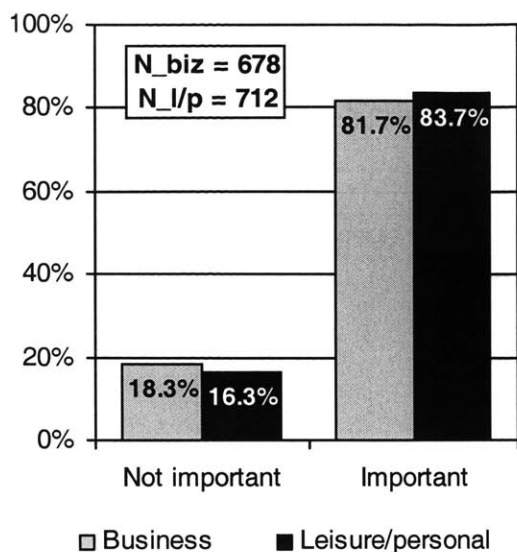


Figure B 293: (Heavy GA Users) Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

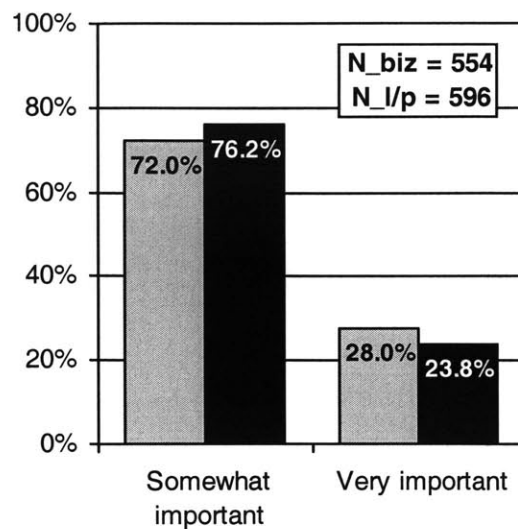


Figure B 294: (Heavy GA Users) Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

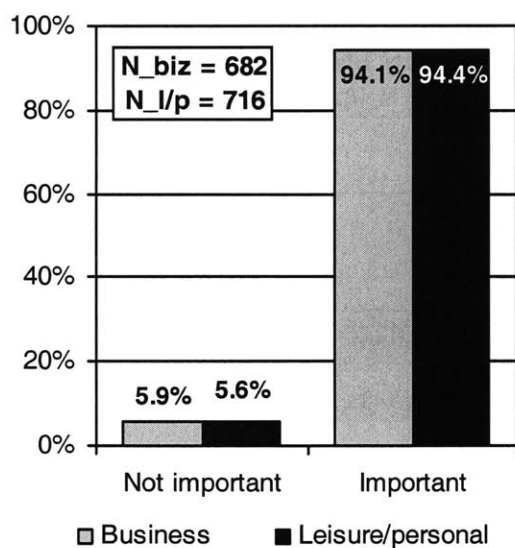


Figure B 295: (Heavy GA Users) Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

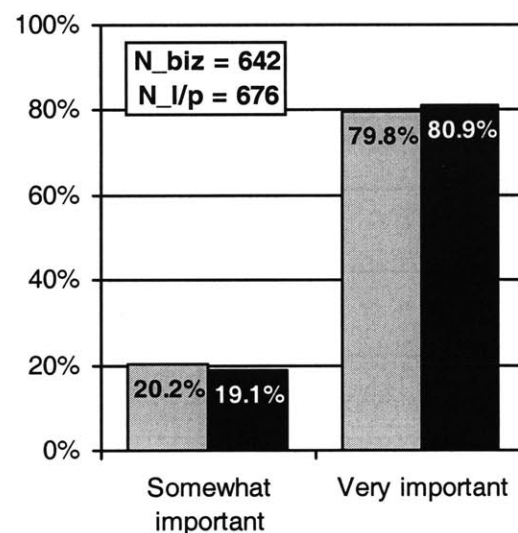


Figure B 296: (Heavy GA Users) Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

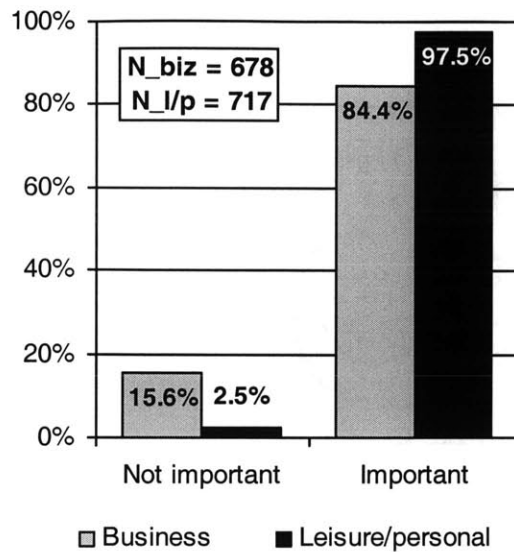


Figure B 297: (Heavy GA Users) Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

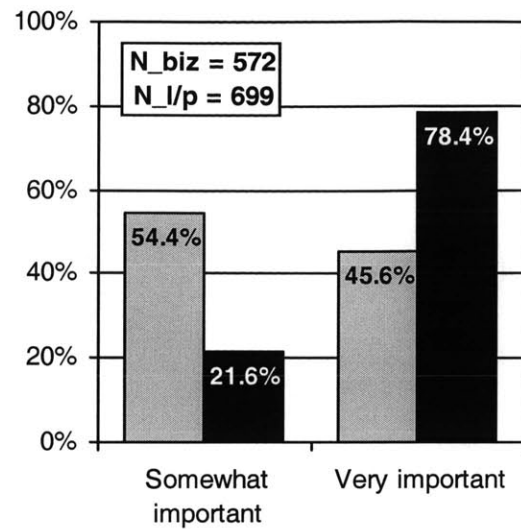


Figure B 298: (Heavy GA Users) Q10 – (Fun) Of those who rated the issue “important,” the degree to which they considered it important

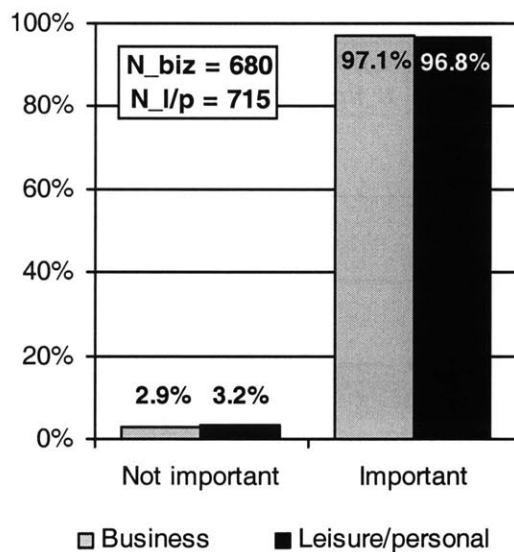


Figure B 299: (Heavy GA Users) Q10 – (Flexibility) How important to you are the following issues in choosing your mode of travel?

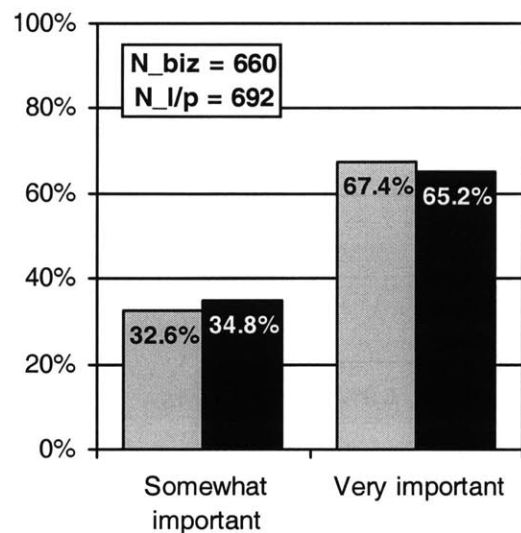


Figure B 300: (Heavy GA Users) Q10 – (Flexibility) Of those who rated the issue “important,” the degree to which they considered it important

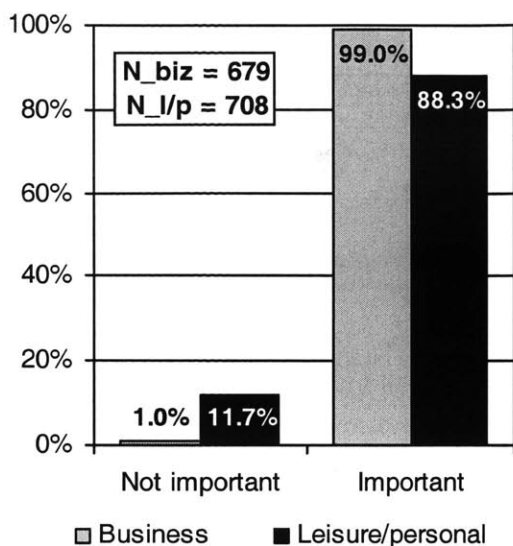


Figure B 301: (Heavy GA Users) Q10 – (Reliability) How important to you are the following issues in choosing your mode of travel?

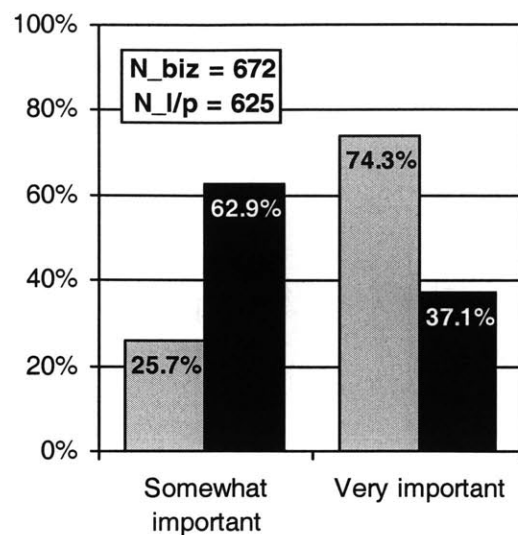


Figure B 302: (Heavy GA Users) Q10 – (Reliability) Of those who rated the issue “important,” the degree to which they considered it important

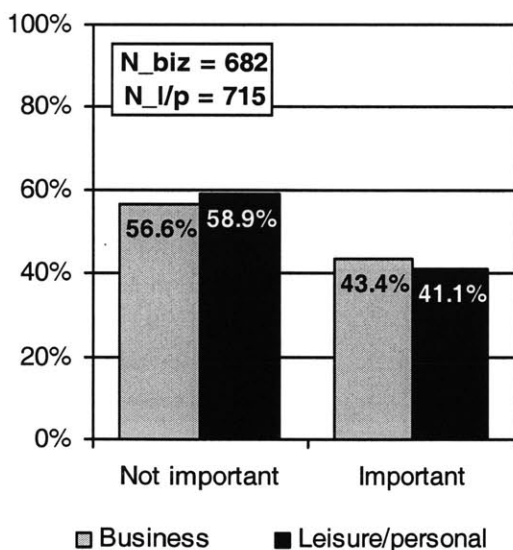


Figure B 303: (Heavy GA Users) Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

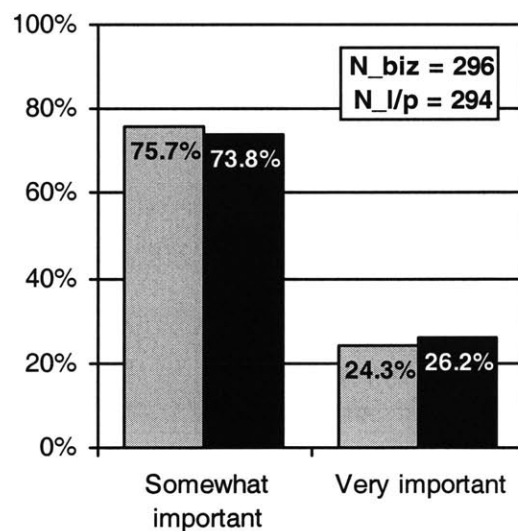


Figure B 304: (Heavy GA Users) Q10 – (Privacy) Of those who rated the issue “important,” the degree to which they considered it important

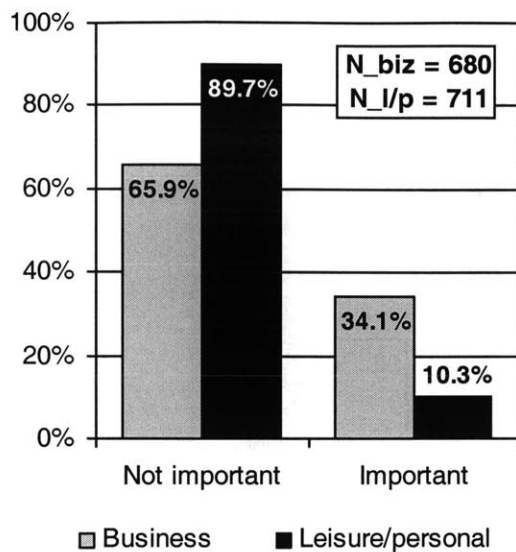


Figure B 305: (Heavy GA Users) Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

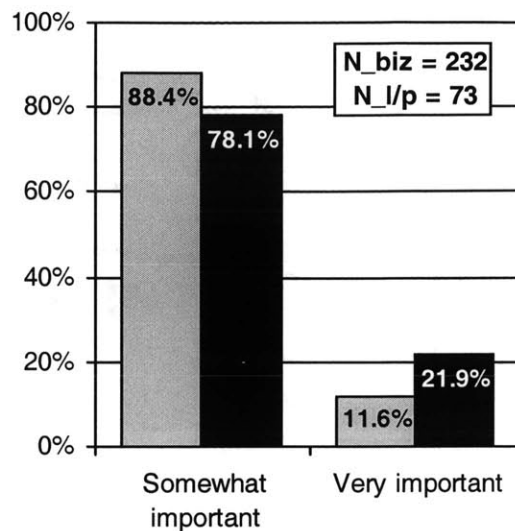


Figure B 306: (Heavy GA Users) Q10 – (Conduct Business) Of those who rated the issue “important,” the degree to which they considered it important

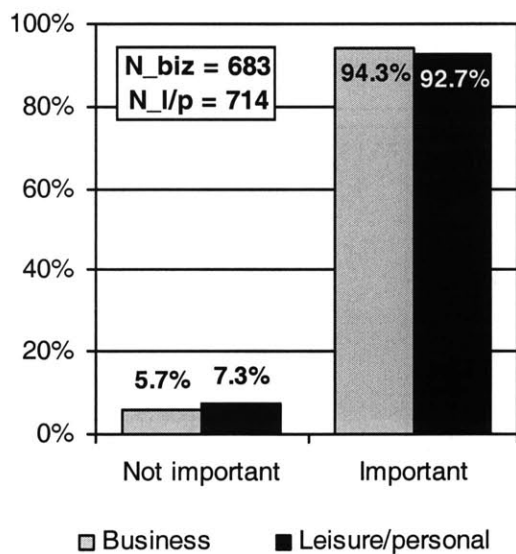


Figure B 307: (Heavy GA Users) Q10 – (Mobility) How important to you are the following issues in choosing your mode of travel?

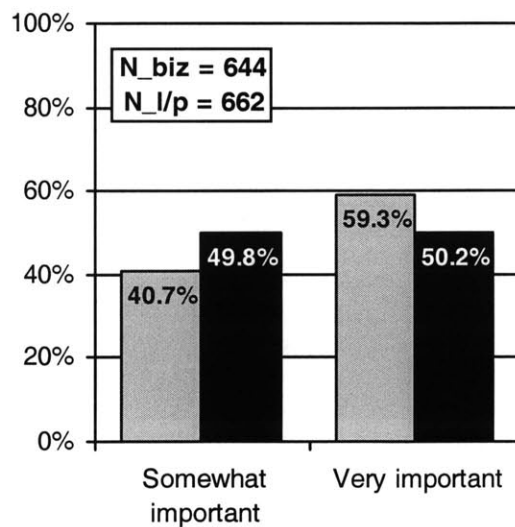


Figure B 308: (Heavy GA Users) Q10 – (Mobility) Of those who rated the issue “important,” the degree to which they considered it important

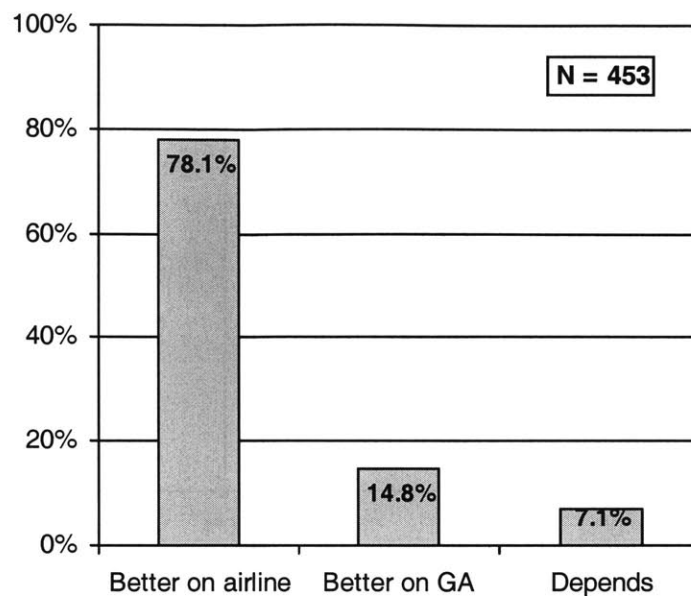


Figure B 309: (Heavy GA Users) Q11 - Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft?

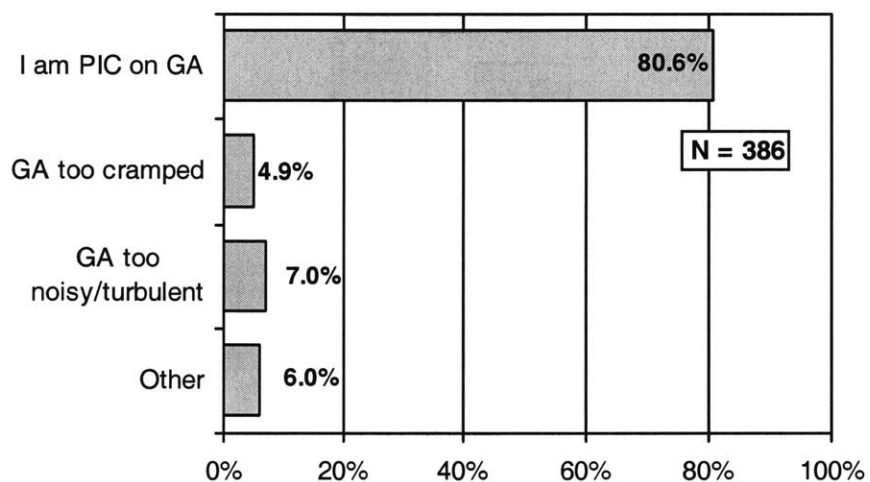


Figure B 310: (Heavy GA Users) Q11 - Ability to work is better on airline because...

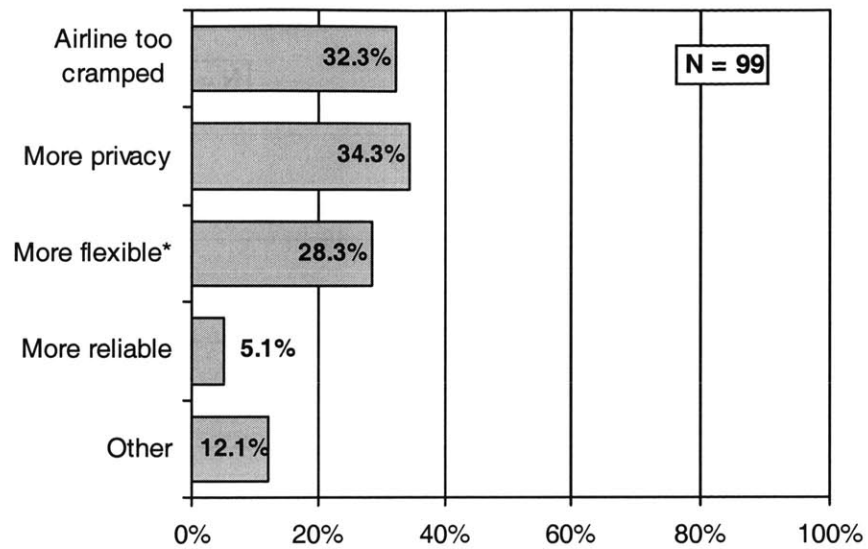


Figure B 311: (Heavy GA Users) Q11 - Ability to work is better on GA because...

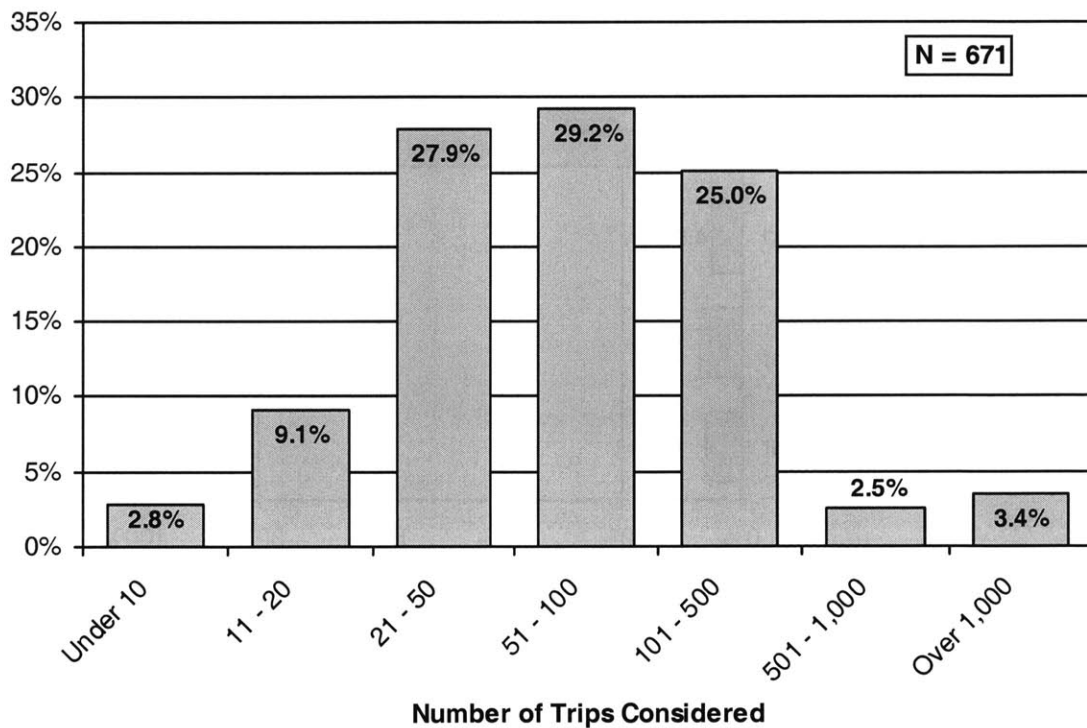


Figure B 312: (Heavy GA Users) Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

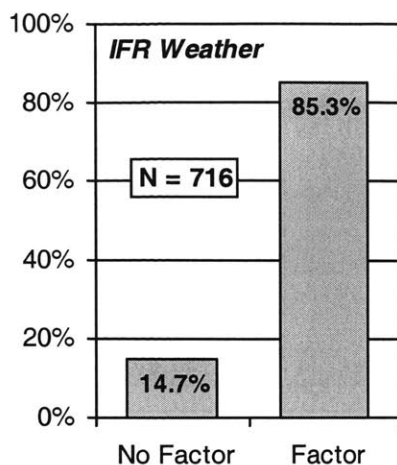


Figure B 313: (Heavy GA Users) Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

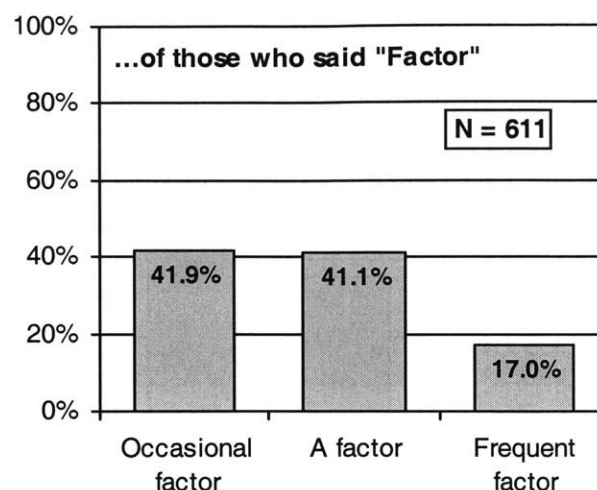


Figure B 314: (Heavy GA Users) Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

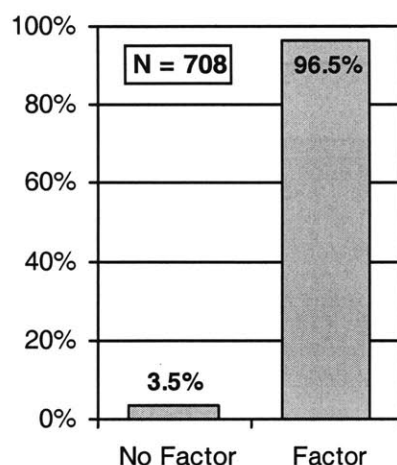


Figure B 315: (Heavy GA Users) Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

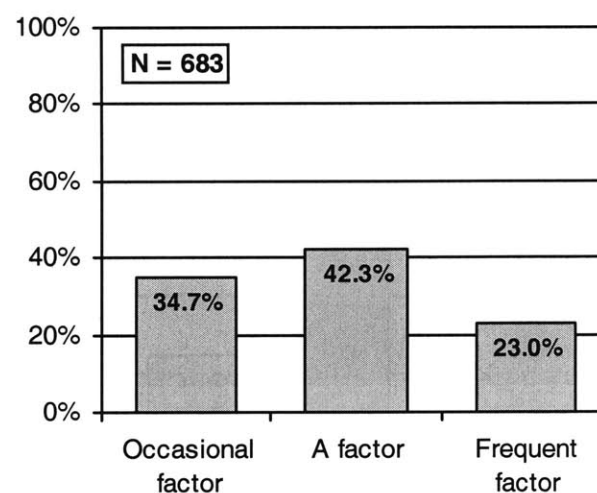


Figure B 316: (Heavy GA Users) Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

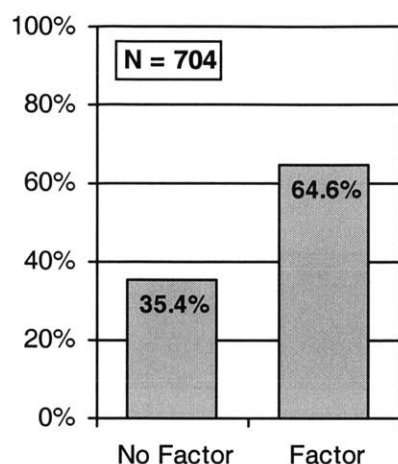


Figure B 317: (Heavy GA Users) Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

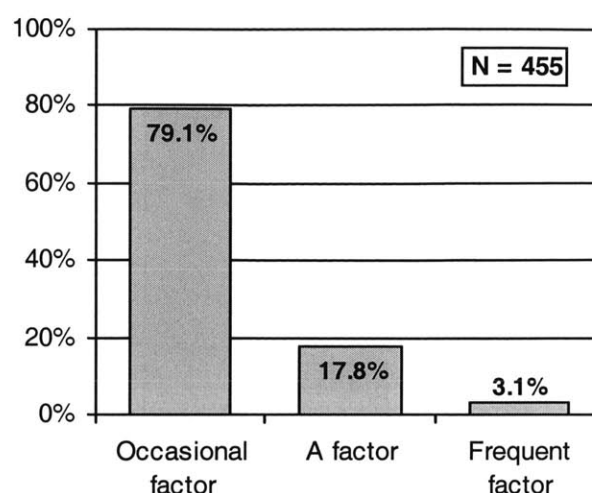


Figure B 318: (Heavy GA Users) Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

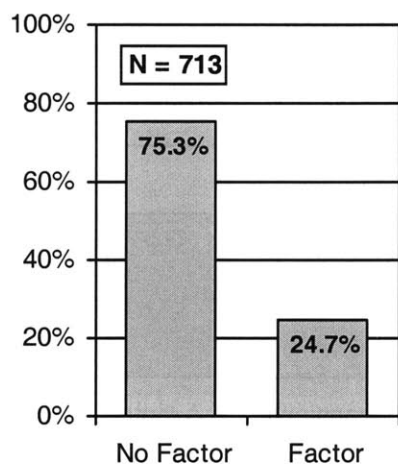


Figure B 319: (Heavy GA Users) Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

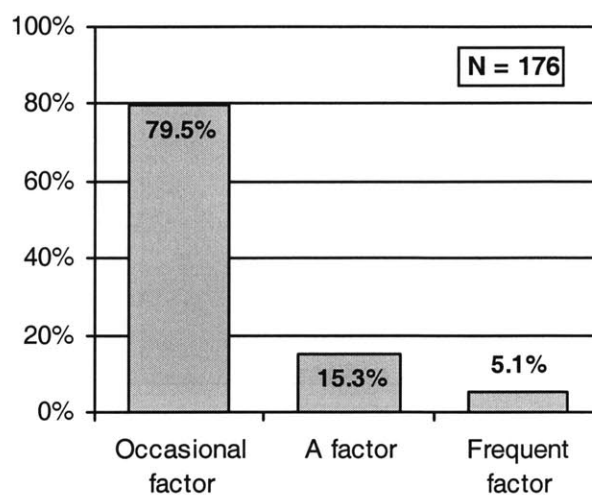


Figure B 320: (Heavy GA Users) Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

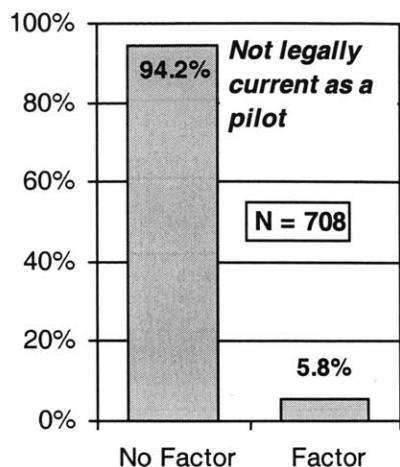


Figure B 321: (Heavy GA Users) Q13 – (Not Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

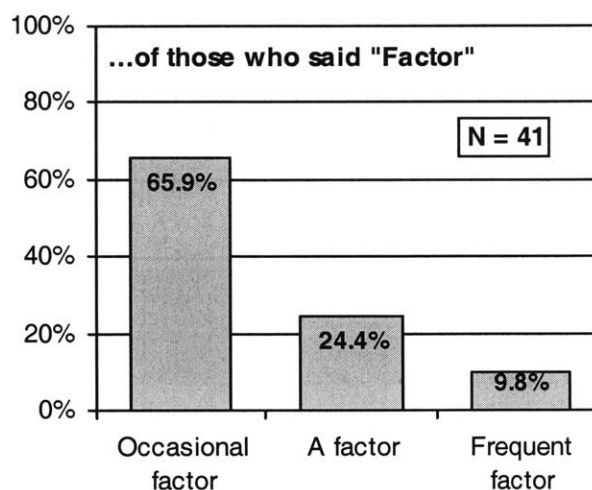


Figure B 322: (Heavy GA Users) Q13 – (Not Current) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

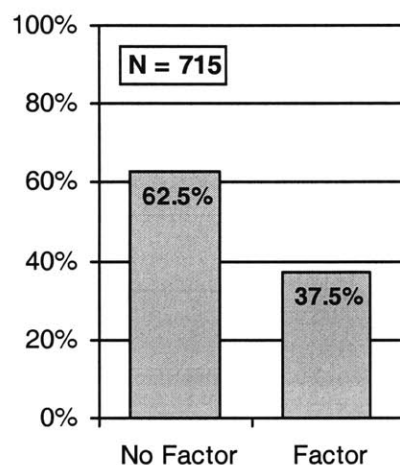


Figure B 323: (Heavy GA Users) Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

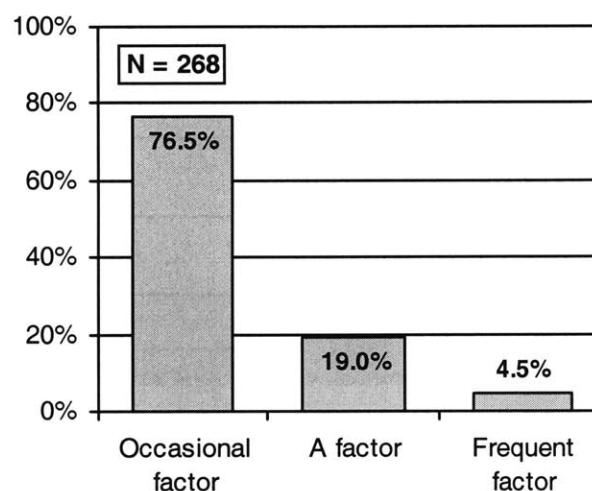


Figure B 324: (Heavy GA Users) Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

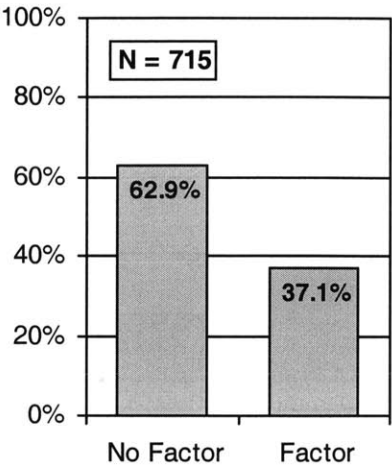


Figure B 325: (Heavy GA Users) Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

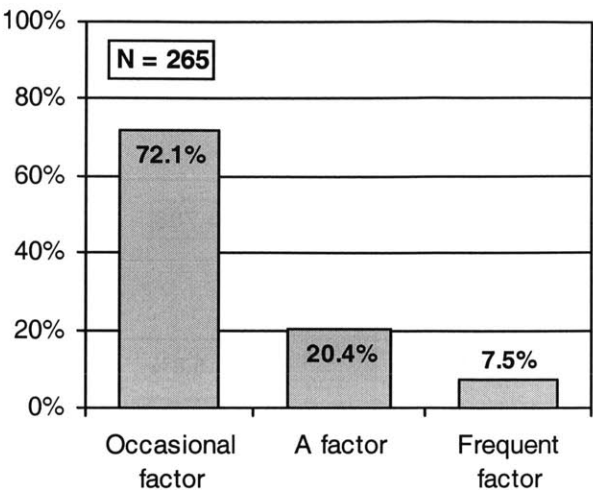


Figure B 326: (Heavy GA Users) Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

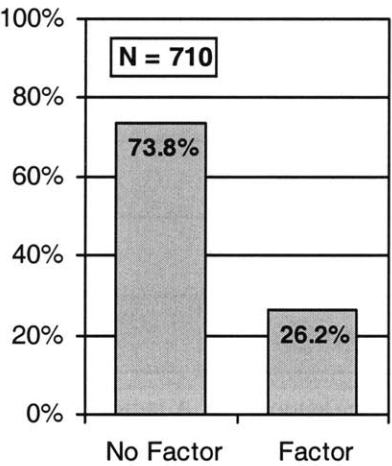


Figure B 327: (Heavy GA Users) Q13 – (Comfort) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

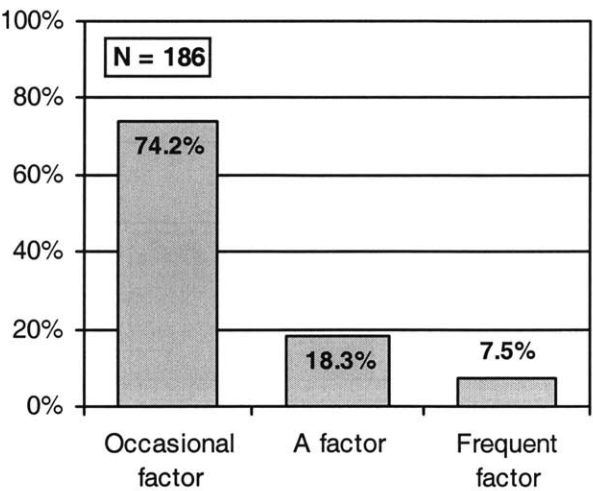


Figure B 328: (Heavy GA Users) Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

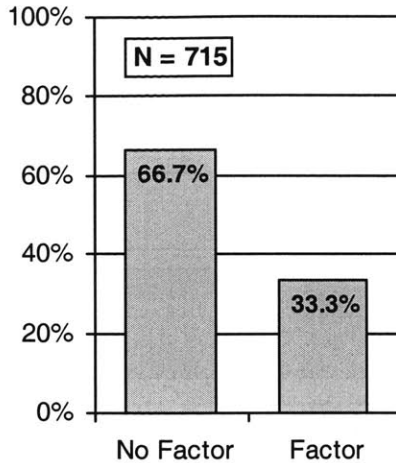


Figure B 329: (Heavy GA Users) Q13 – (Scheduling) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

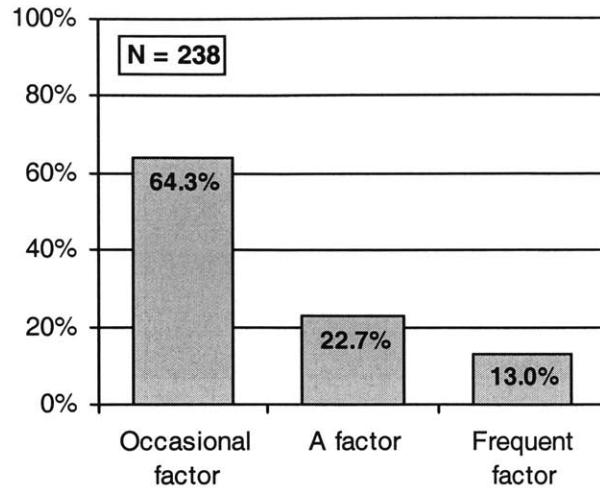


Figure B 330: (Heavy GA Users) Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

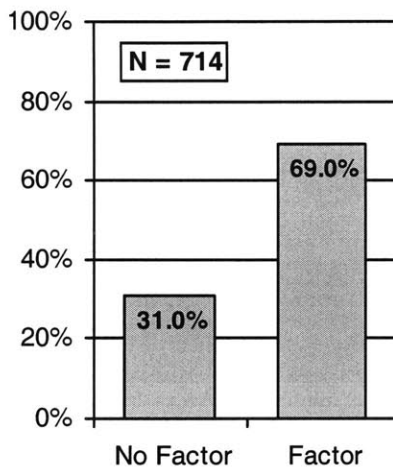


Figure B 331: (Heavy GA Users) Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

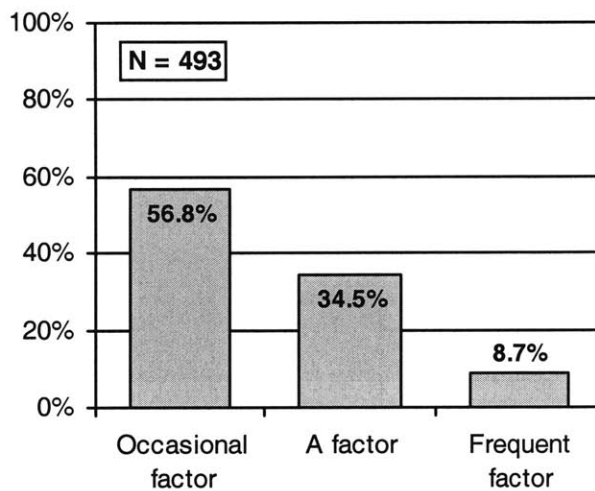


Figure B 332: (Heavy GA Users) Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

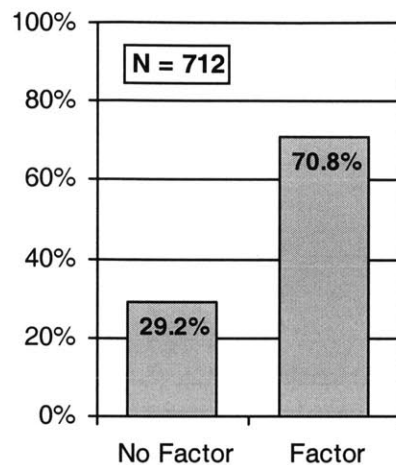


Figure B 333: (Heavy GA Users) Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

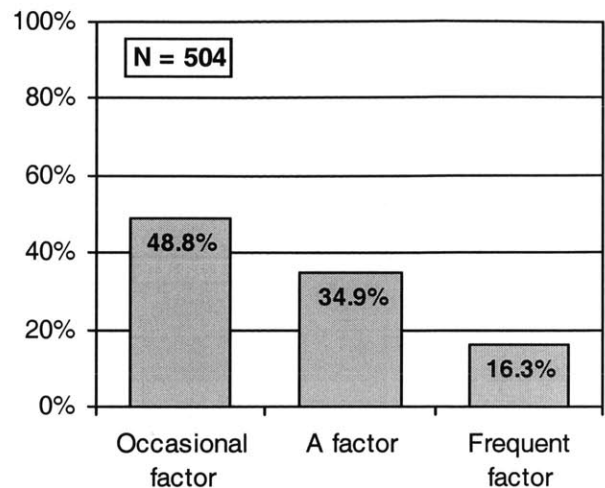


Figure B 334: (Heavy GA Users) Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

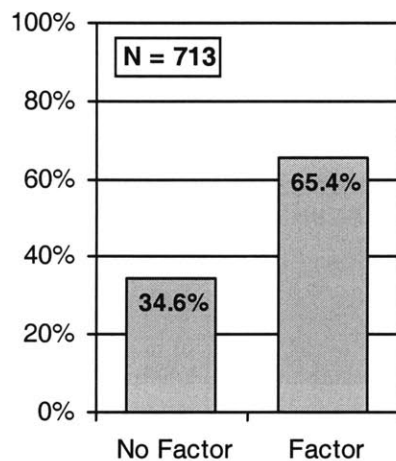


Figure B 335: (Heavy GA Users) Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

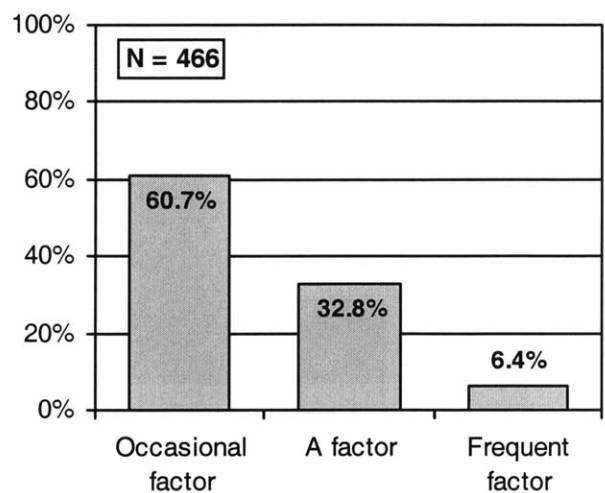


Figure B 336: (Heavy GA Users) Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

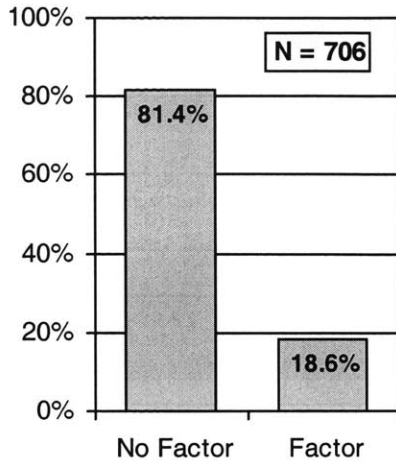


Figure B 337: (Heavy GA Users) Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

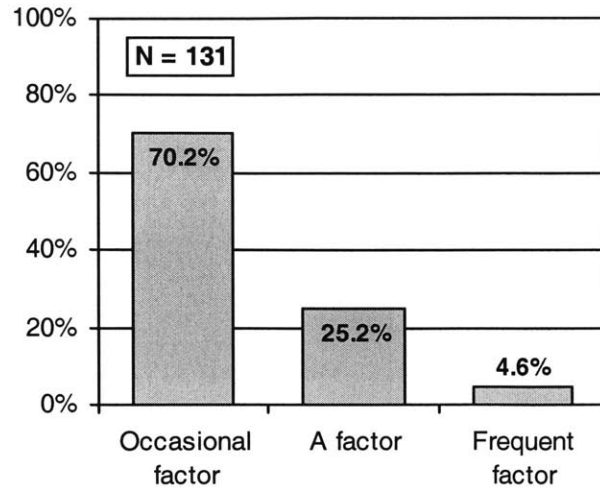


Figure B 338: (Heavy GA Users) Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

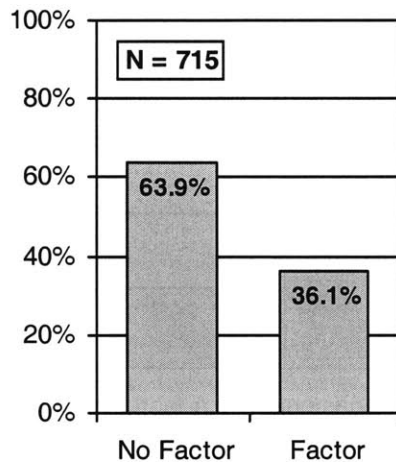


Figure B 339: (Heavy GA Users) Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

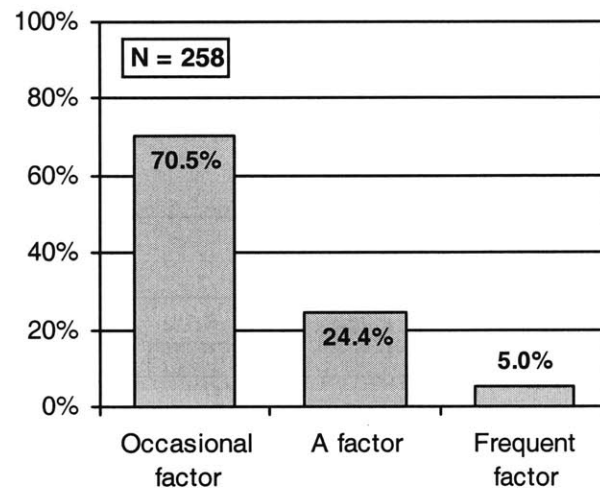


Figure B 340: (Heavy GA Users) Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

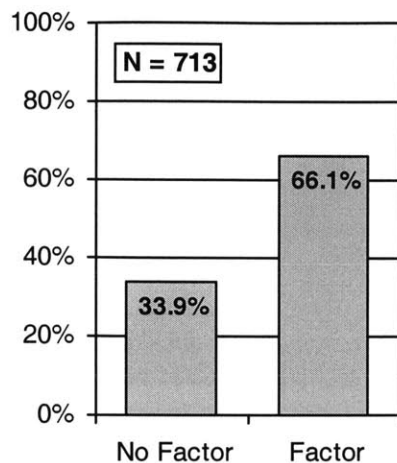


Figure B 341: (Heavy GA Users) Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

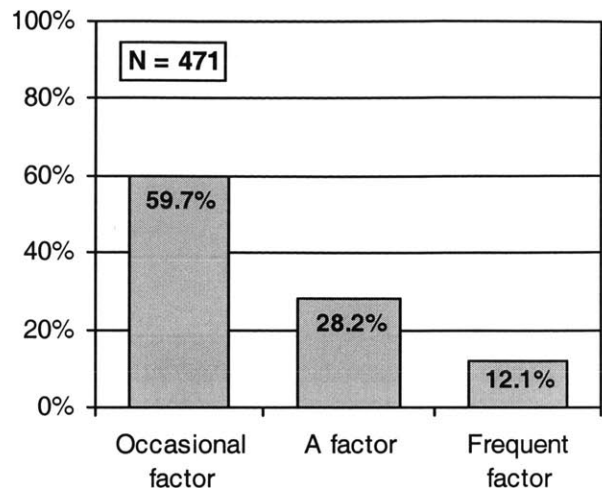


Figure B 342: (Heavy GA Users) Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

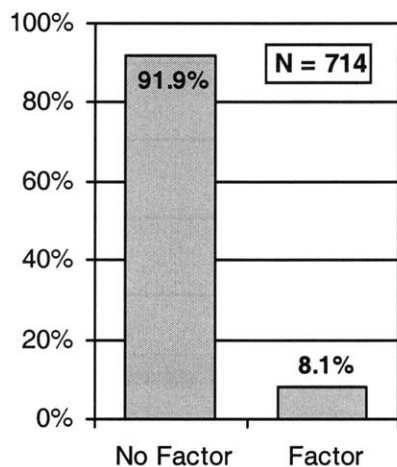


Figure B 343: (Heavy GA Users) Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

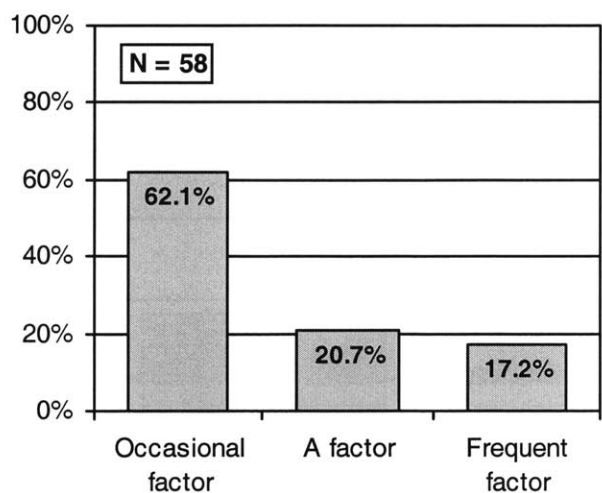


Figure B 344: (Heavy GA Users) Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

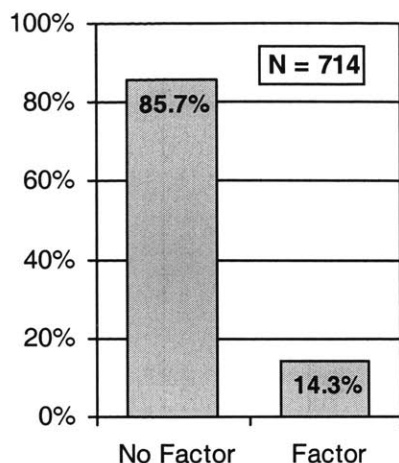


Figure B 345: (Heavy GA Users) Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

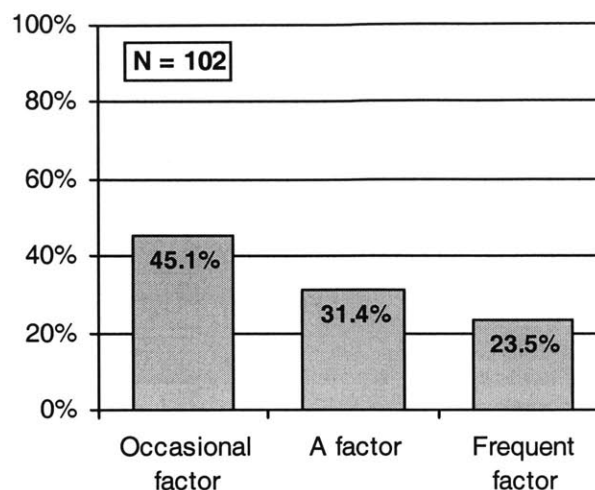


Figure B 346: (Heavy GA Users) Q13 – (Insurance Costs) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

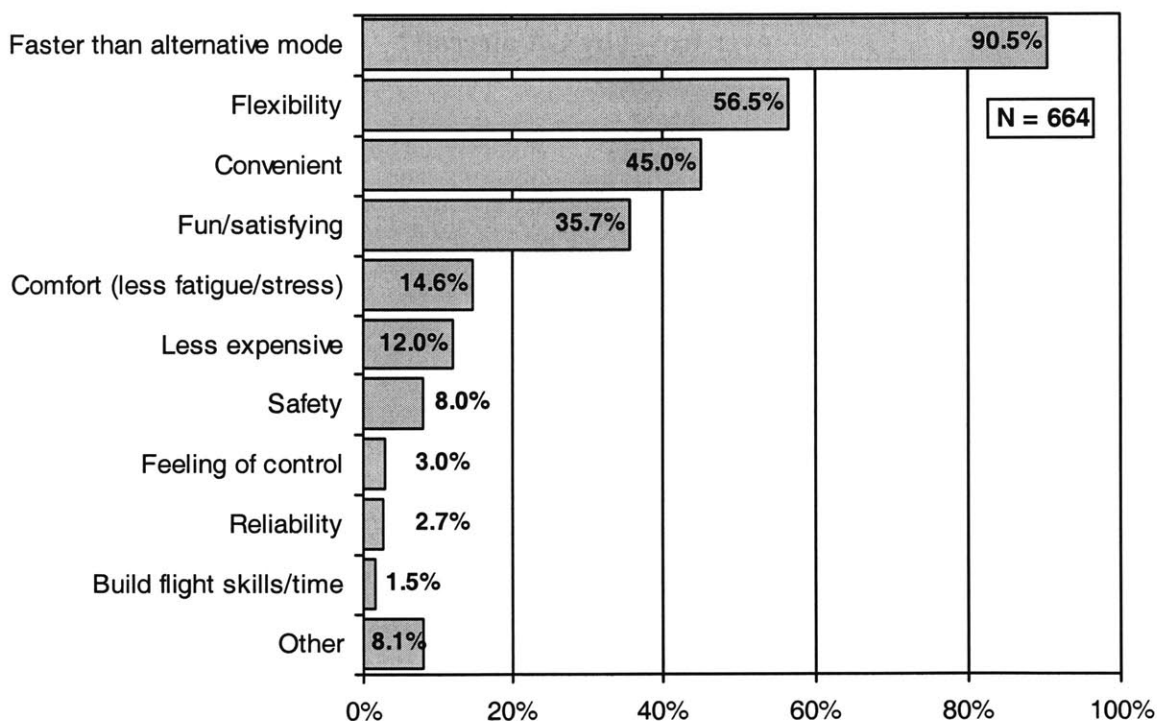


Figure B 347: (Heavy GA Users) Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

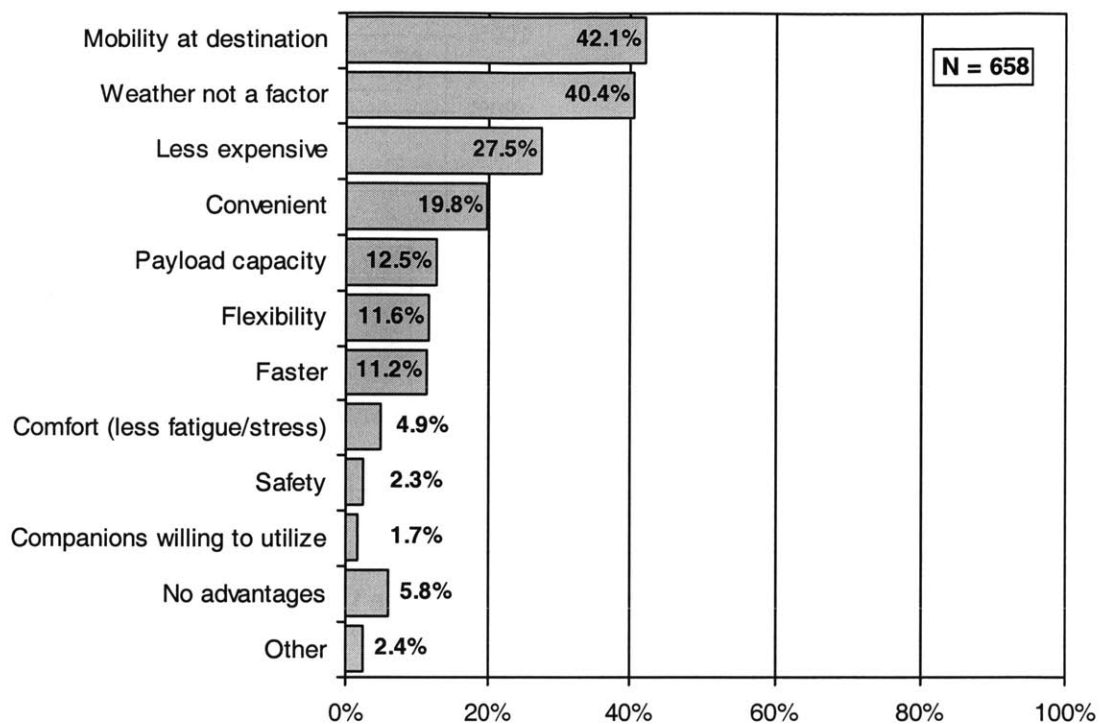


Figure B 348: (Heavy GA Users) Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

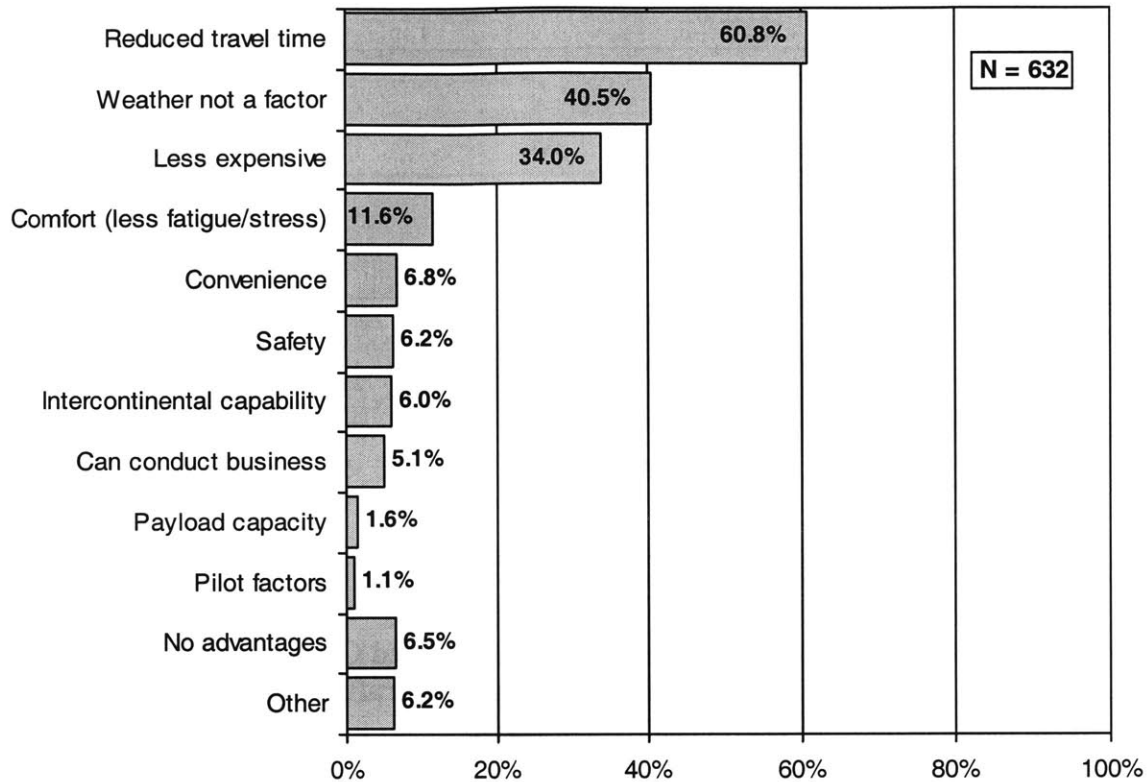


Figure B 349: (Heavy GA Users) Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

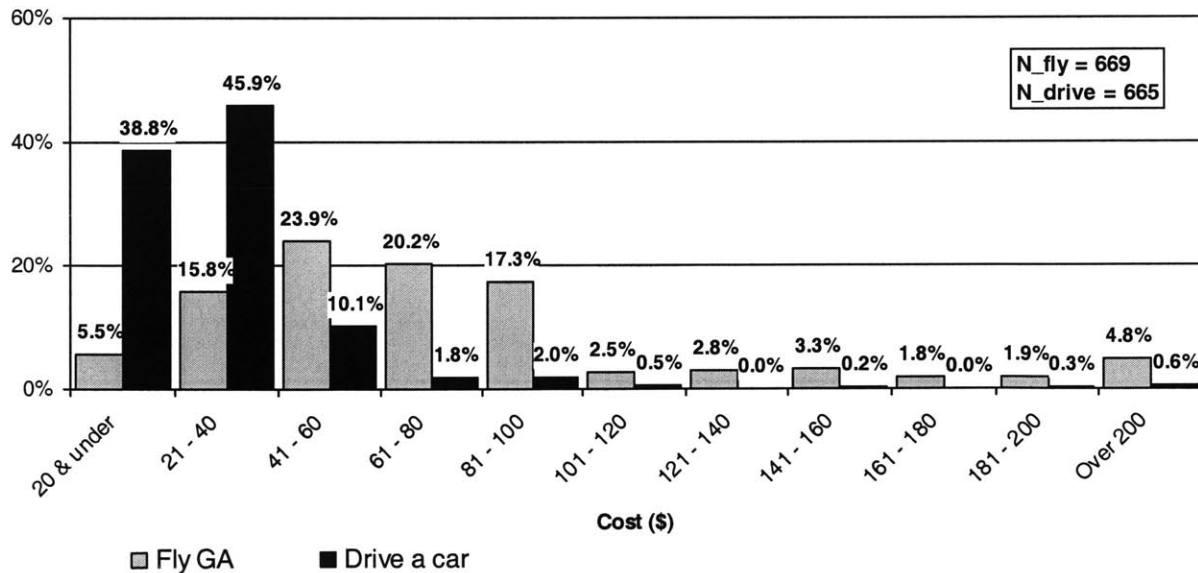


Figure B 350: (Heavy GA Users) Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

(single engine aircraft only)

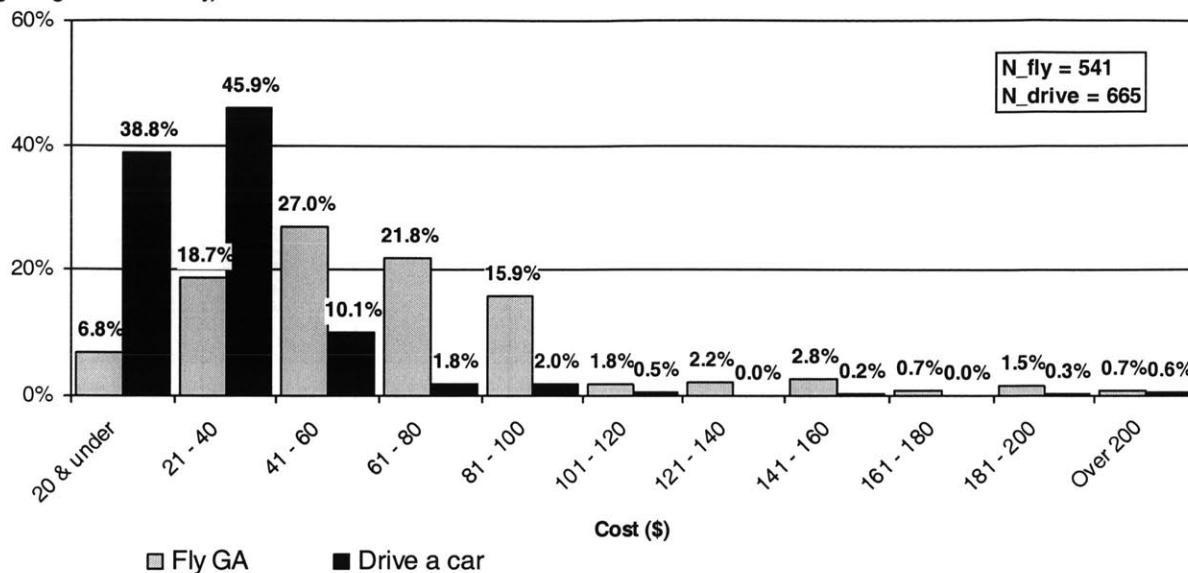


Figure B 351: (Heavy GA Users) Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

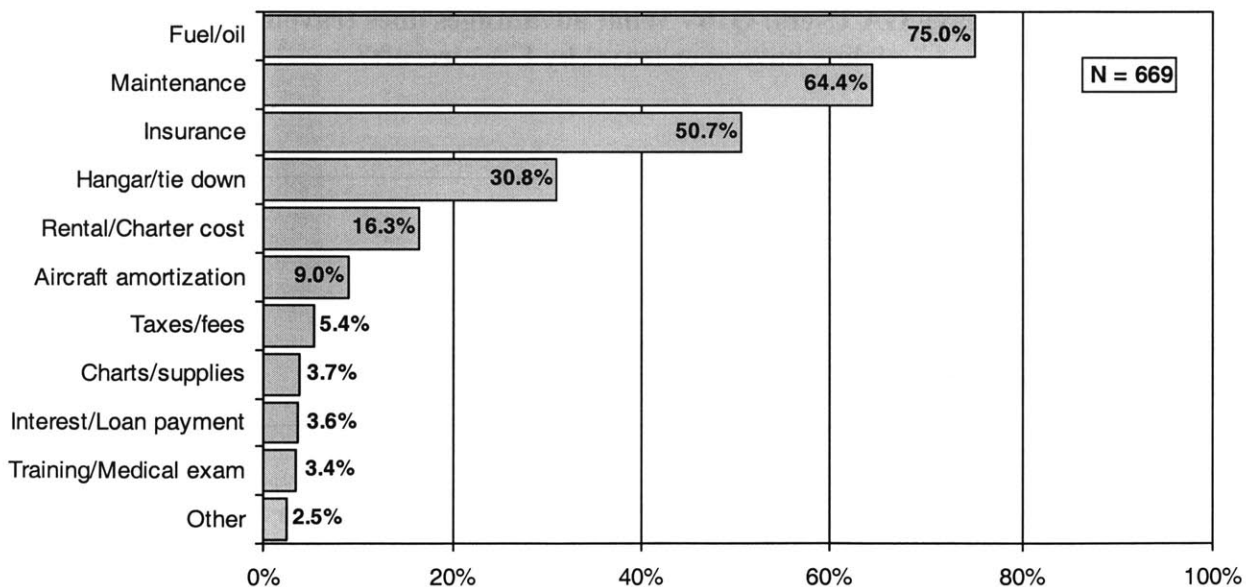


Figure B 352: (Heavy GA Users) Q17 - What items create this cost to fly 100 statute miles?

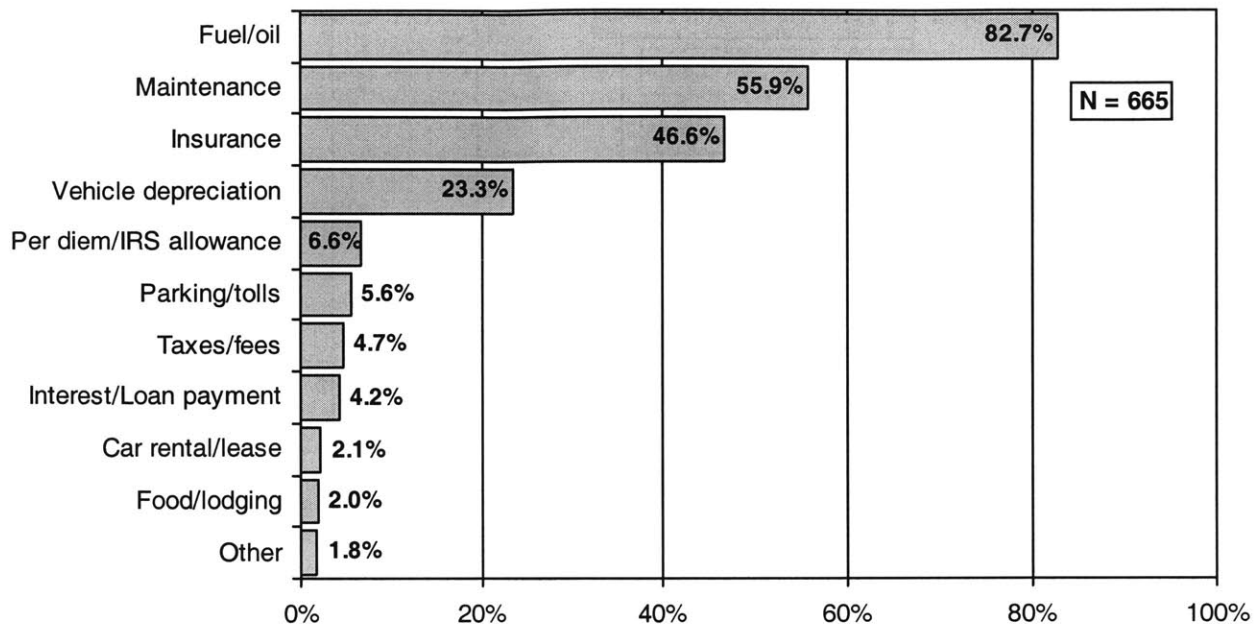


Figure B 353: (Heavy GA Users) Q18 - What items create this cost to drive a car 100 statute miles?

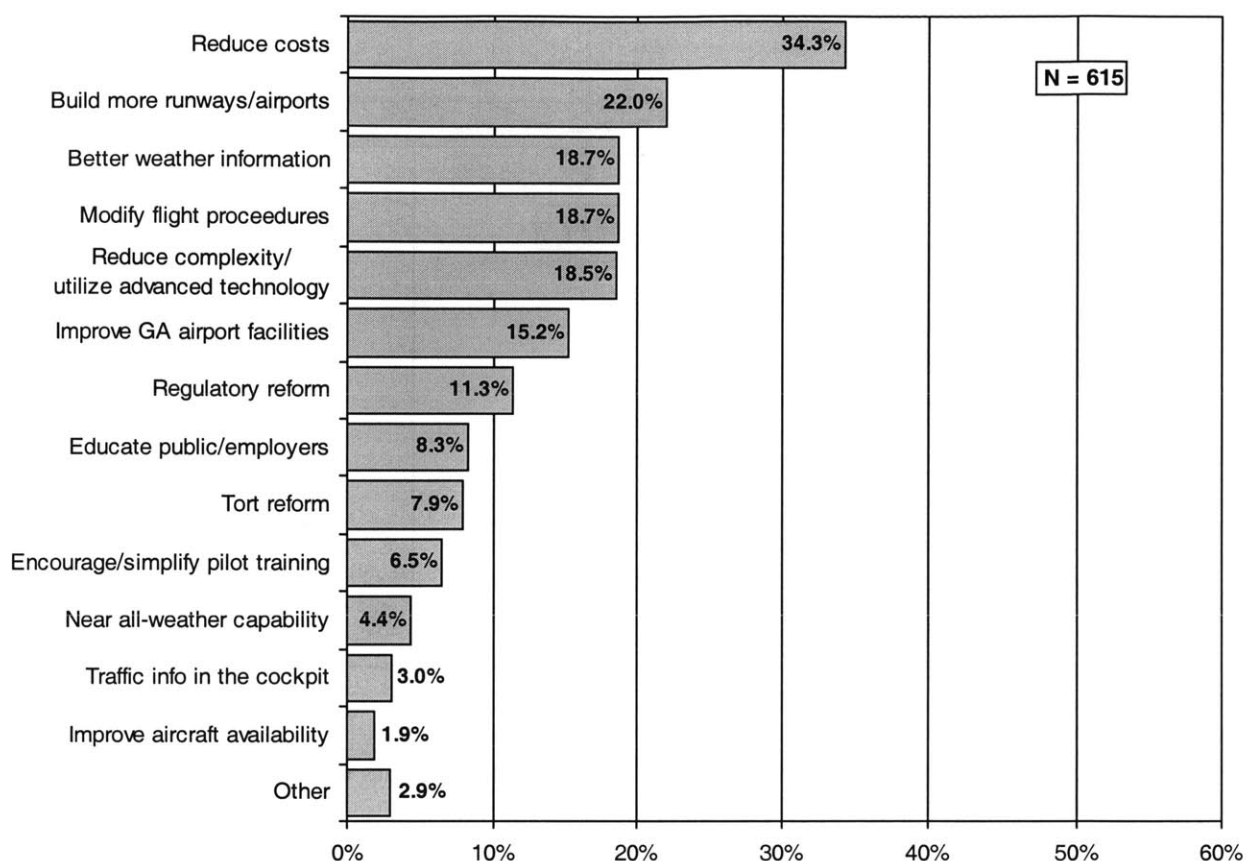


Figure B 354: (Heavy GA Users) Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

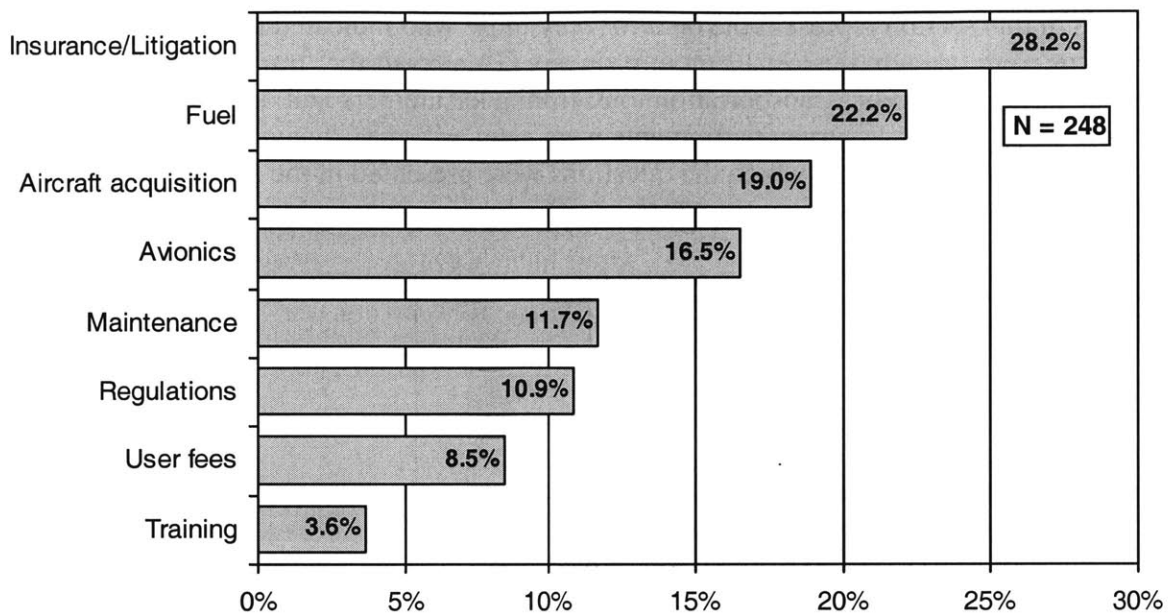


Figure B 355: (Heavy GA Users) Q19 - Specific Areas Cited For Cost Reduction

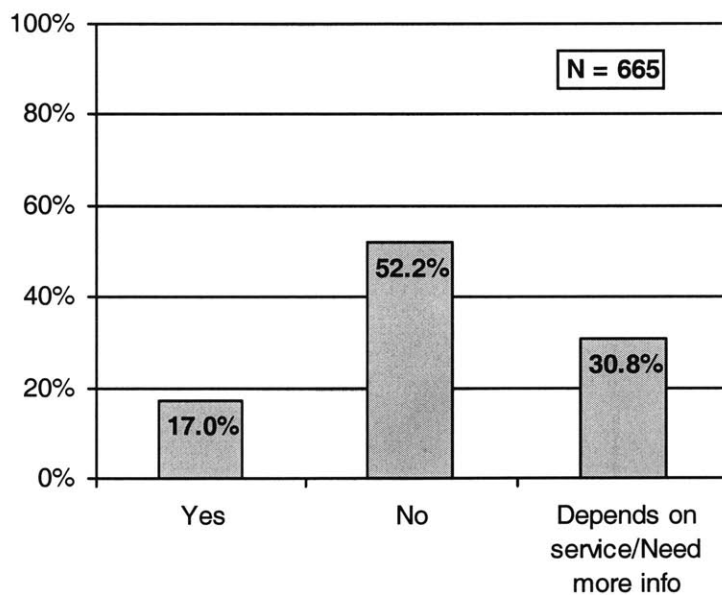


Figure B 356: (Heavy GA Users) Q20 - Would Those Surveyed Use a Proposed Dispatch Service

B6 SURVEY RESULTS: HEAVY USERS OF COMMERCIAL AIRLINES

The figures in this section represent the data for only those who indicated in survey question 1 that 10+ trips were taken in the last 12 months on any GA aircraft for “transportation to & from a business destination” and/or “transportation to & from a leisure/personal destination.” Two hundred and fourteen (214) survey participants were categorized as “heavy airline users.” The data is presented in the order in which the questions were presented in the survey. See Appendix A for a complete copy of the survey.

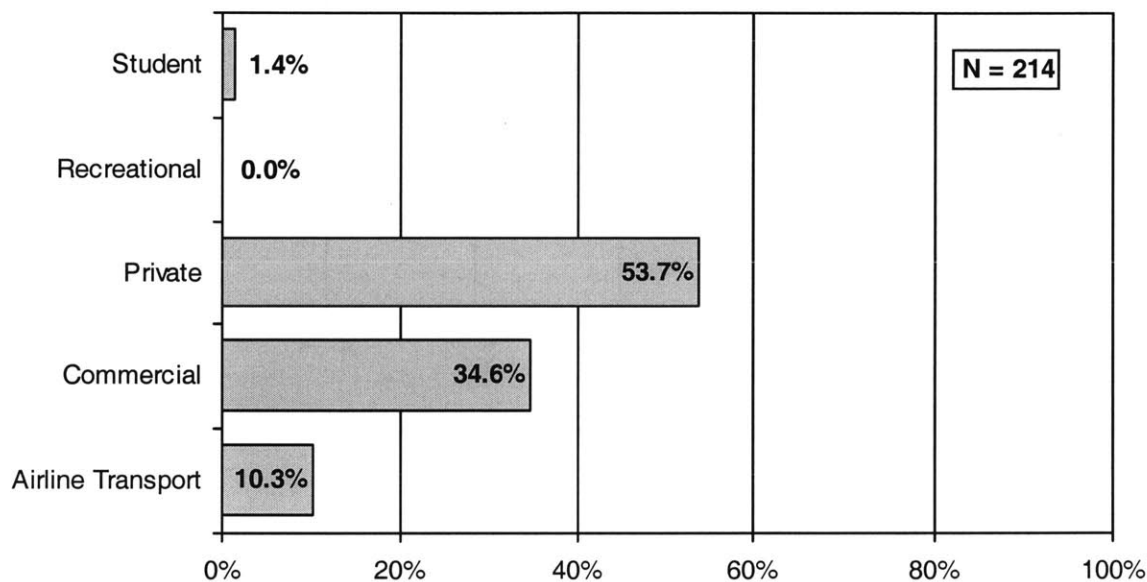


Figure B 357: (Heavy Airline Users) Survey Respondents' Pilot Certificate

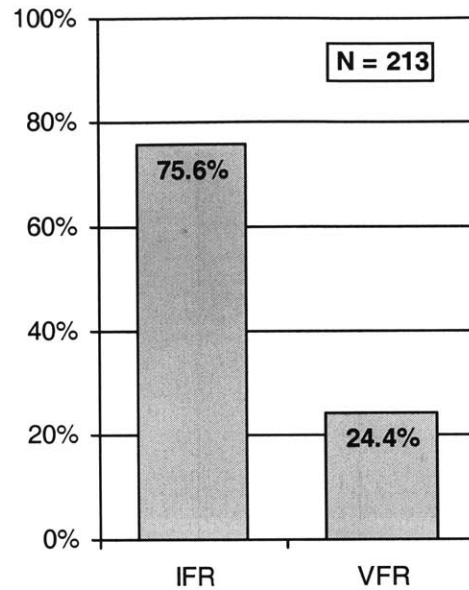


Figure B 358: (Heavy Airline Users) Survey Respondents' Instrument Rating

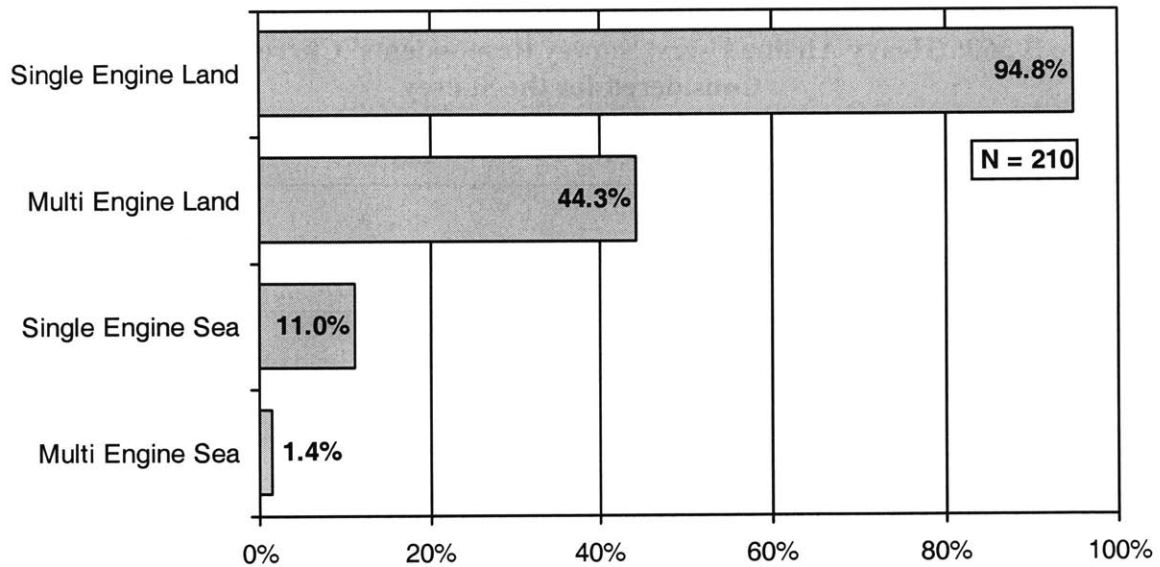


Figure B 359: (Heavy Airline Users) Survey Respondents' Airplane Class Rating

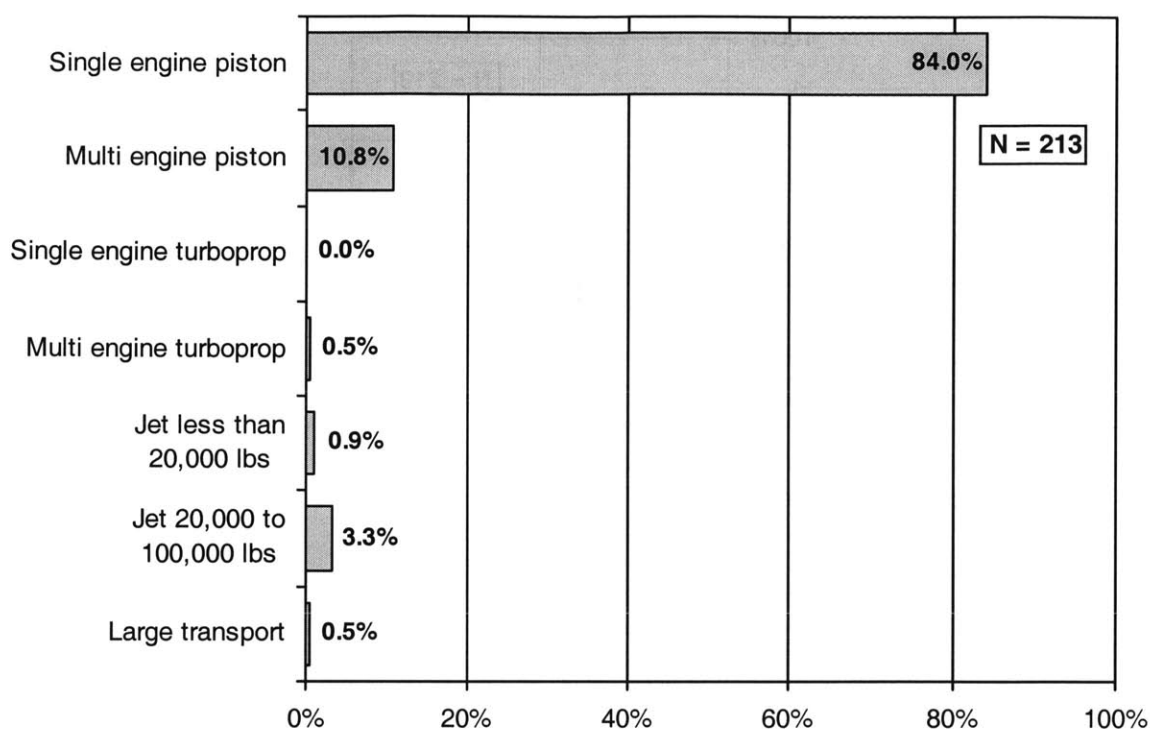


Figure B 360: (Heavy Airline Users) Survey Respondents' Current Airplane Type Considered for the Survey

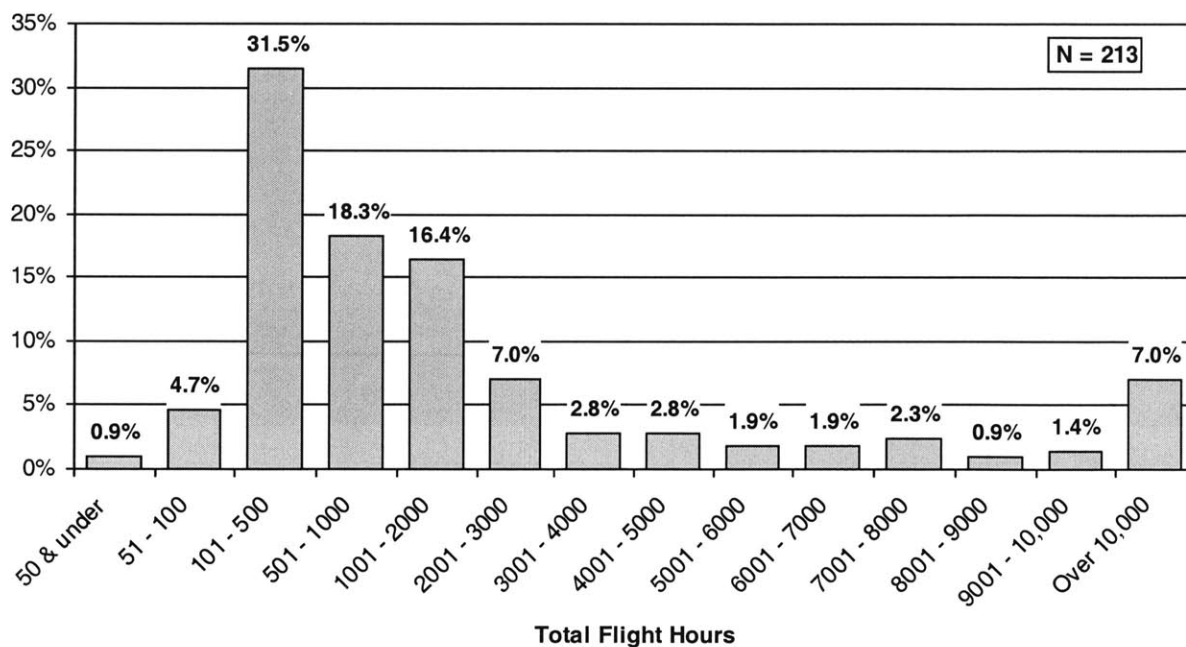


Figure B 361: (Heavy Airline Users) Survey Respondents' Total Flight Hours

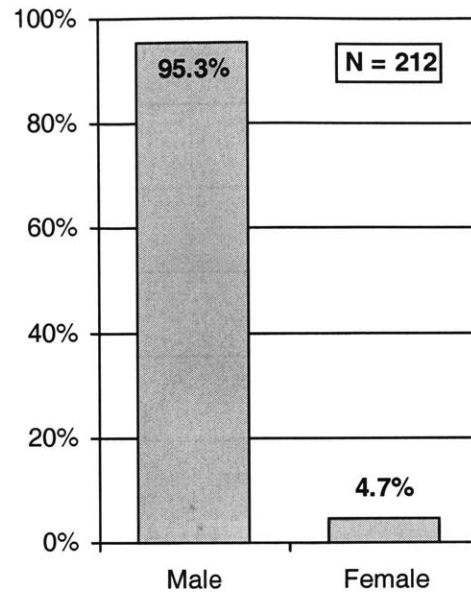


Figure B 362: (Heavy Airline Users) Survey Respondents' Gender

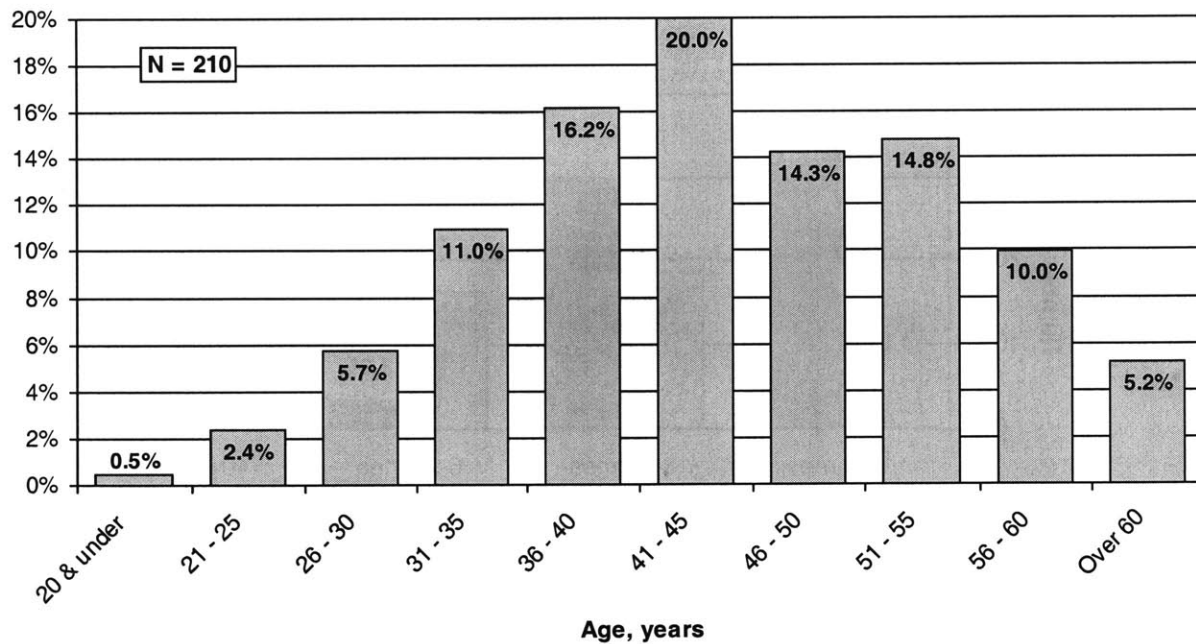


Figure B 363: (Heavy Airline Users) Survey Respondents' Age

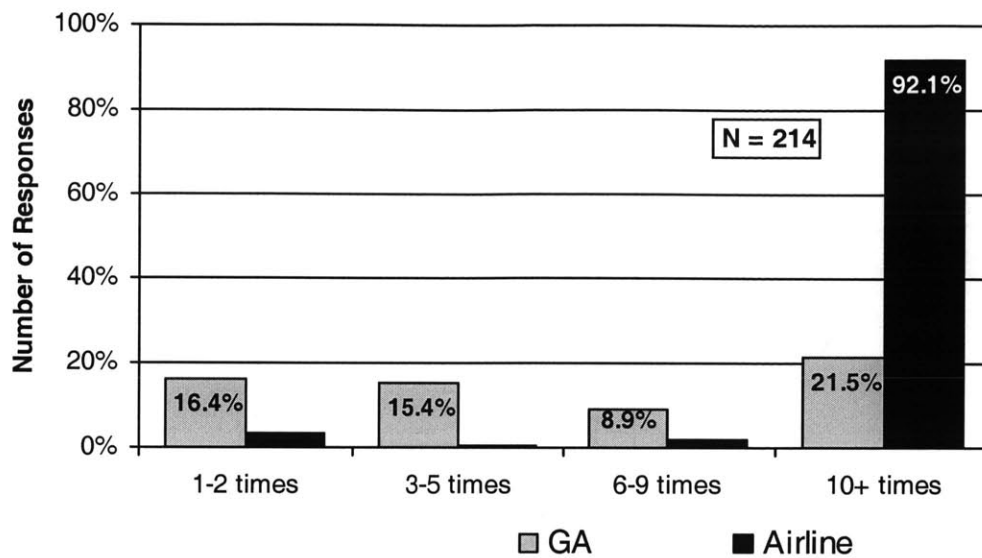


Figure B 364: (Heavy Airline Users) Q1 & Q2 - Trips Taken For Transportation To And From A Business Destination

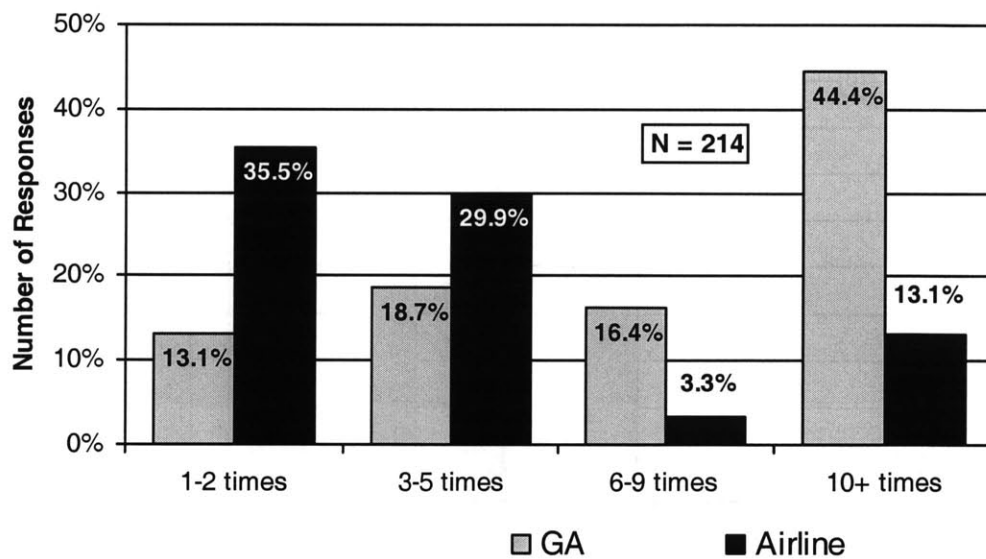


Figure B 365: (Heavy Airline Users) Q1 & Q2 - Trips Taken For Transportation To And From A Leisure/Personal Destination

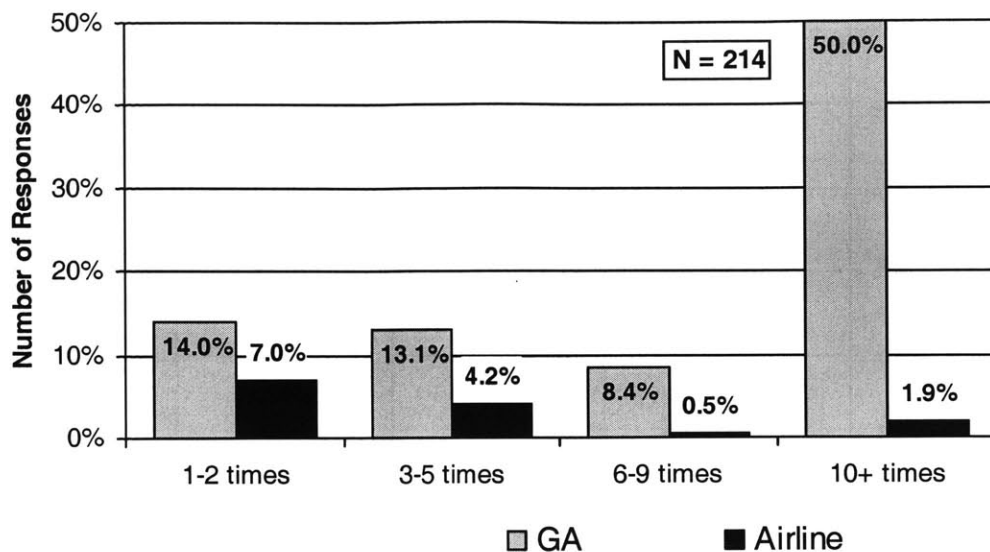


Figure B 366: (Heavy Airline Users) Q1 & Q2 - Trips Taken For Pure Recreation

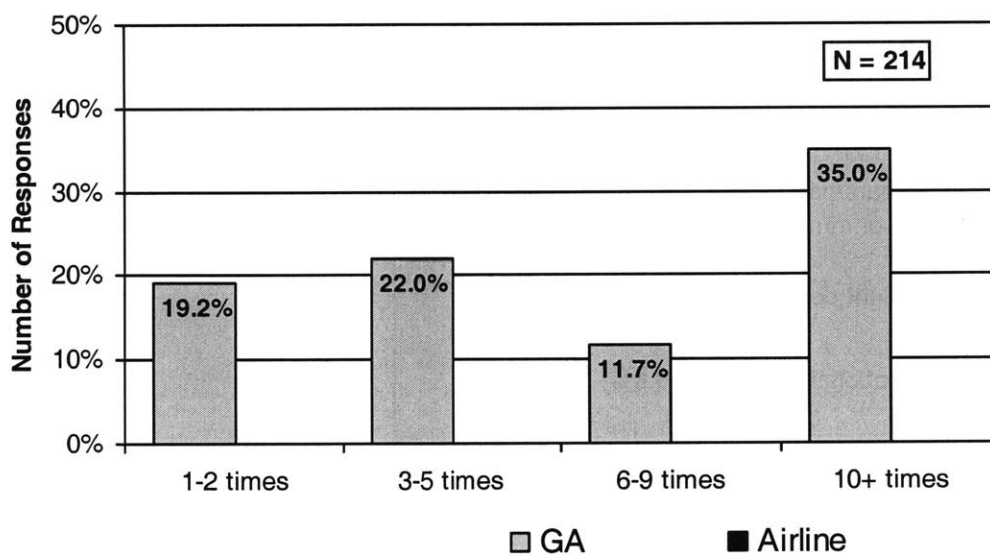


Figure B 367: (Heavy Airline Users) Q1 & Q2 - Trips Taken For Training

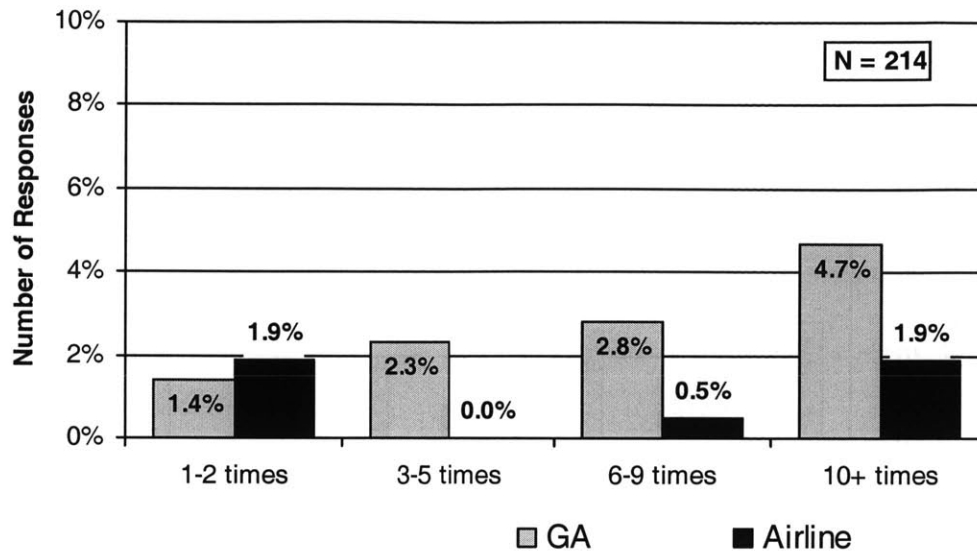


Figure B 368: (Heavy Airline Users) Q1 & Q2 - Trips Taken For Other Purposes

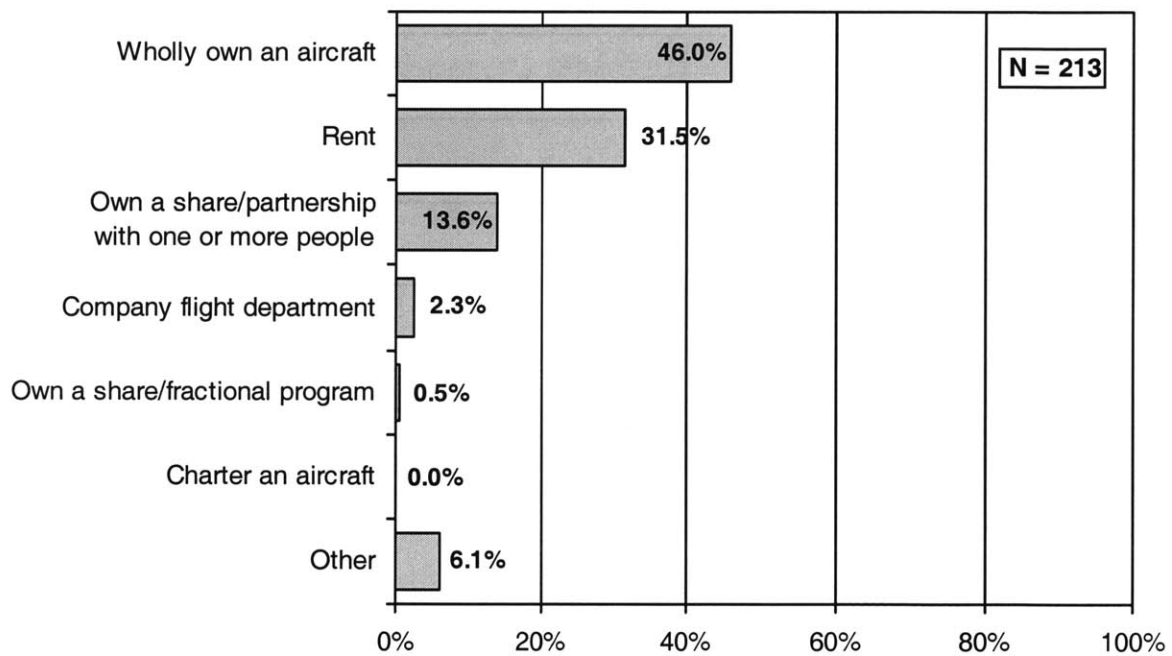


Figure B 369: (Heavy Airline Users) Q3 - When you fly on GA aircraft, how do you typically obtain the aircraft?

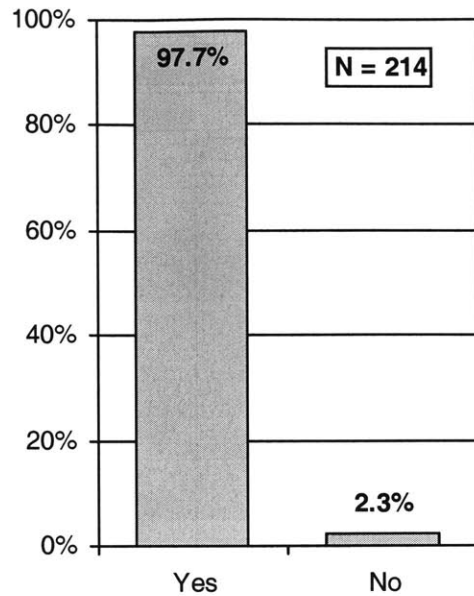


Figure B 370: (Heavy Airline Users) Q4 - When you fly on GA aircraft are you typically the pilot in command?

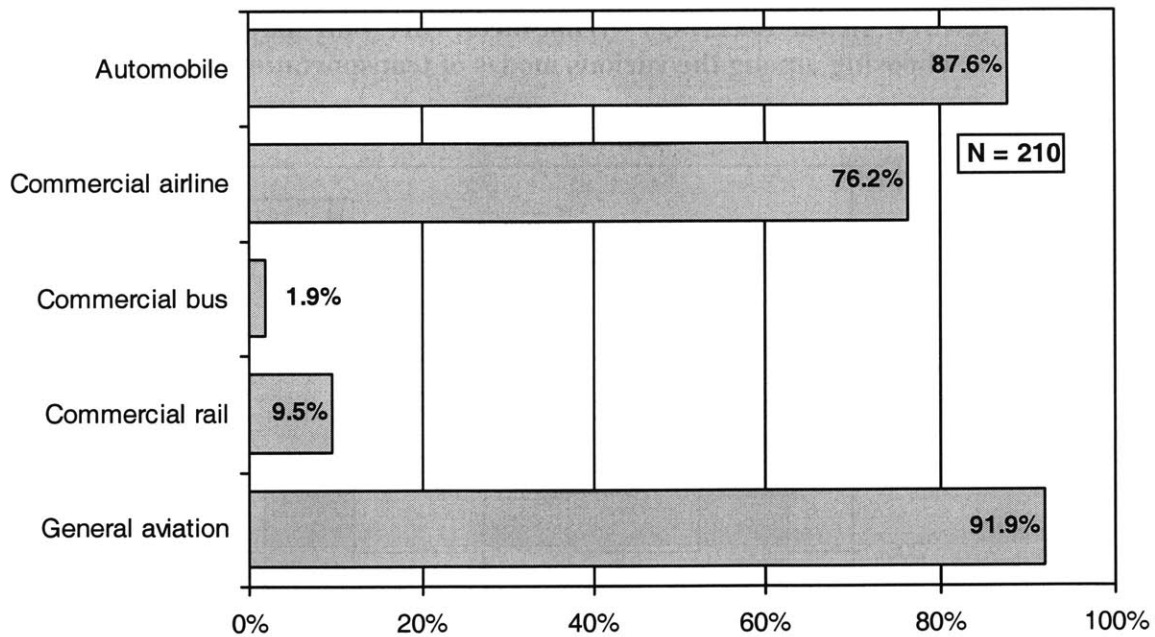


Figure B 371: (Heavy Airline Users) Q5 - Which of the following transportation modes do you consider for any trip of 75 statute miles or greater?

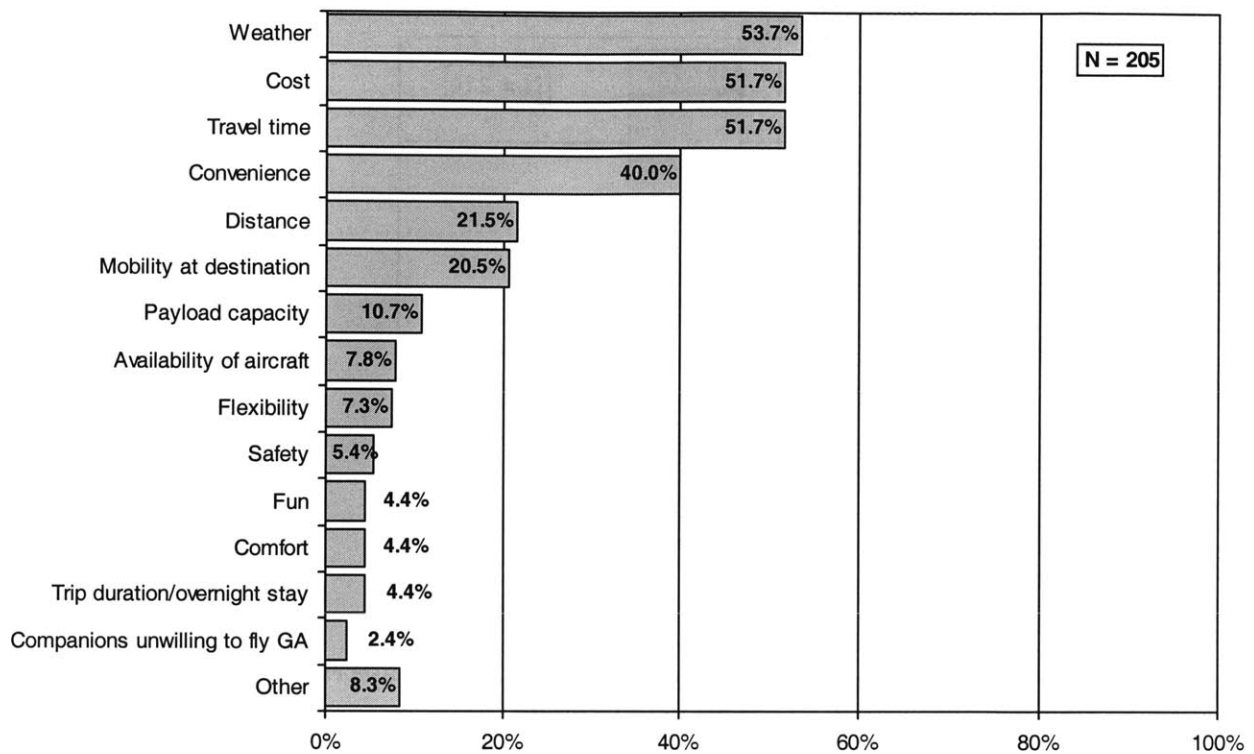


Figure B 372: (Heavy Airline Users) Q6 - What factors are your major considerations in choosing among the various modes of transportation?

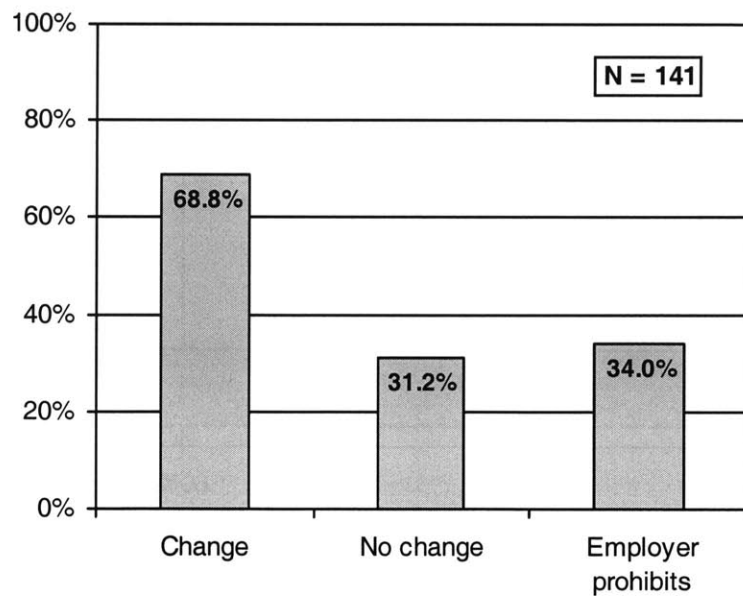


Figure B 373: (Heavy Airline Users) Q7 - How do these factors change if your trip is for business purposes rather than personal/leisure, or vice versa?

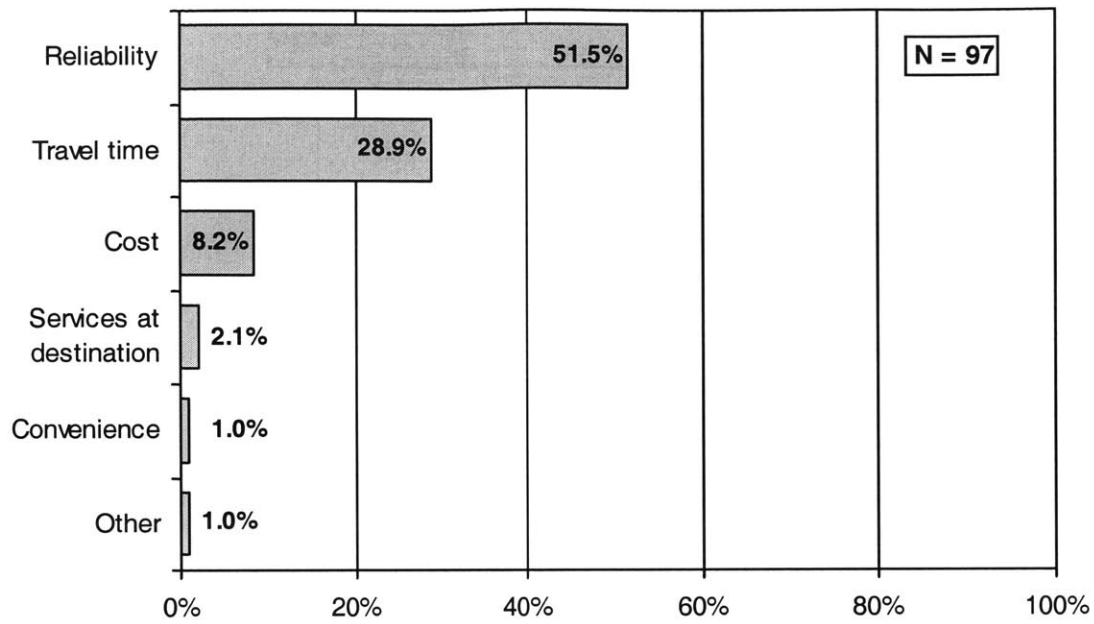


Figure B 374: (Heavy Airline Users) Q7 - For Business Trips: Factors That Become More Important

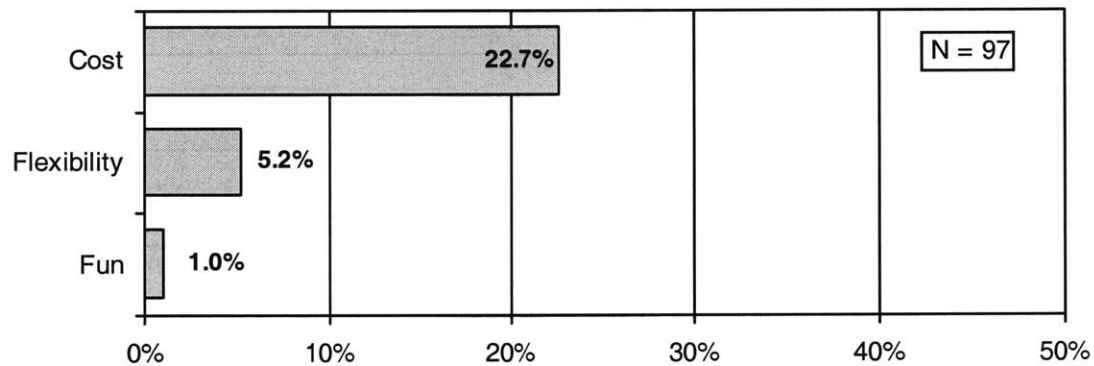


Figure B 375: (Heavy Airline Users) Q7 - For Leisure/Personal Trips: Factors That Become More Important

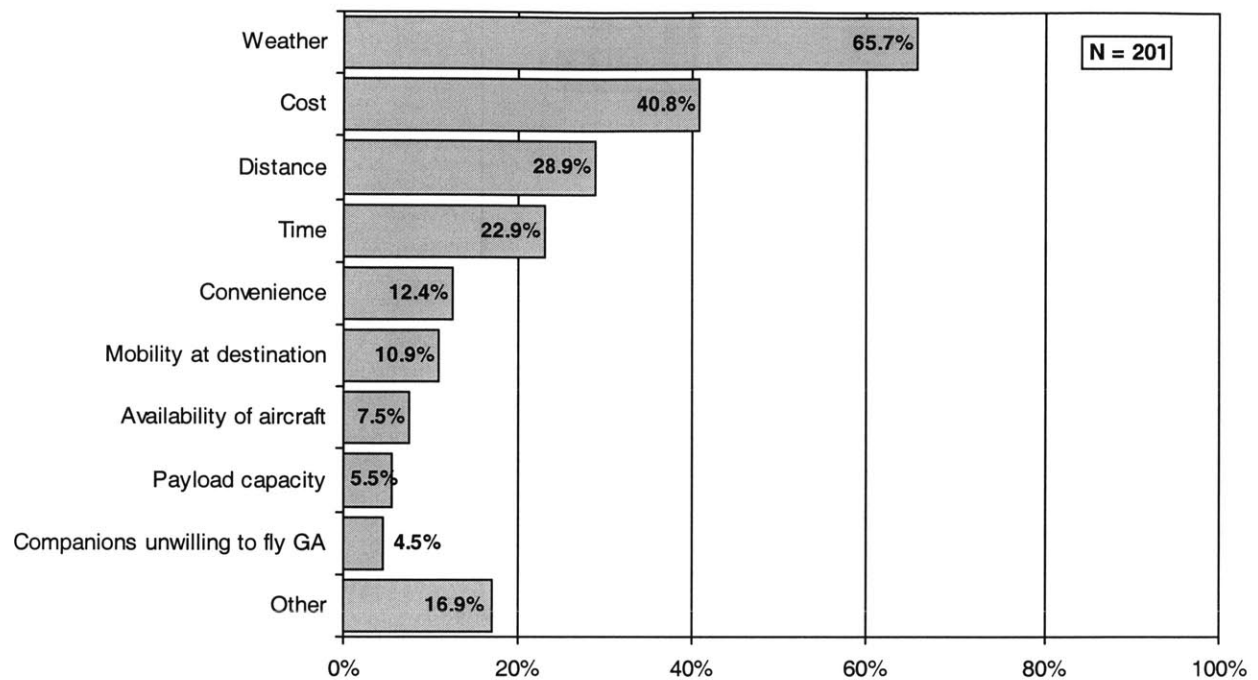


Figure B 376: (Heavy Airline Users) Q8 - Please list what you consider to be the major reasons you would choose not to travel by GA aircraft on any given trip.

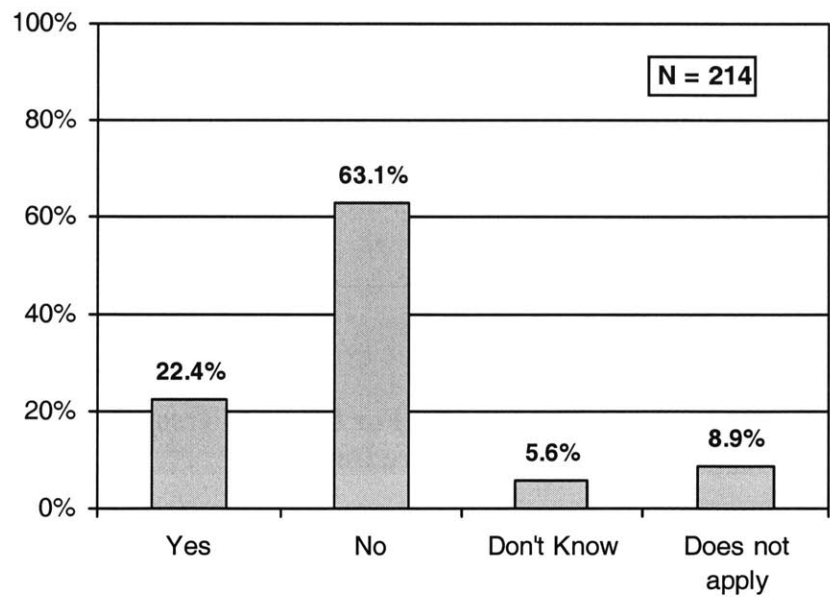


Figure B 377: (Heavy Airline Users) Q9 - Does your employer have a policy prohibiting you from traveling on GA aircraft for business purposes?

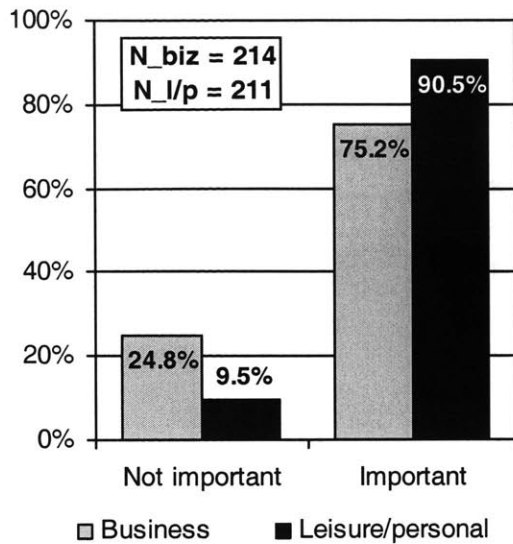


Figure B 378: (Heavy Airline Users) Q10 – (Expense) How important to you are the following issues in choosing your mode of travel?

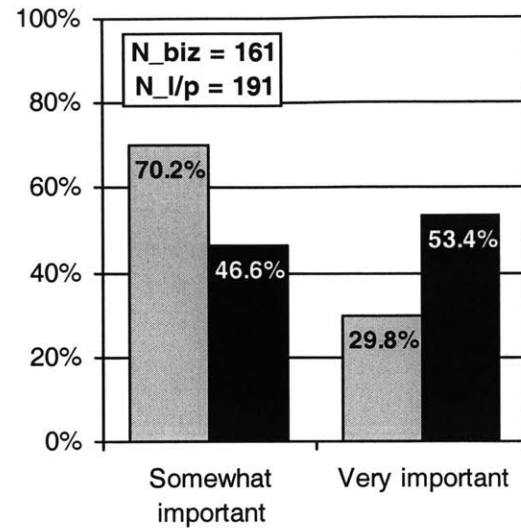


Figure B 379: (Heavy Airline Users) Q10 – (Expense) Of those who rated the issue “important,” the degree to which they considered it important

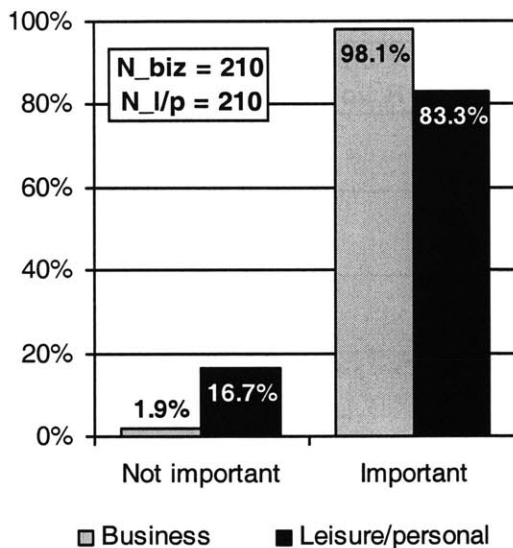


Figure B 380: (Heavy Airline Users) Q10 – (Travel Time) How important to you are the following issues in choosing your mode of travel?

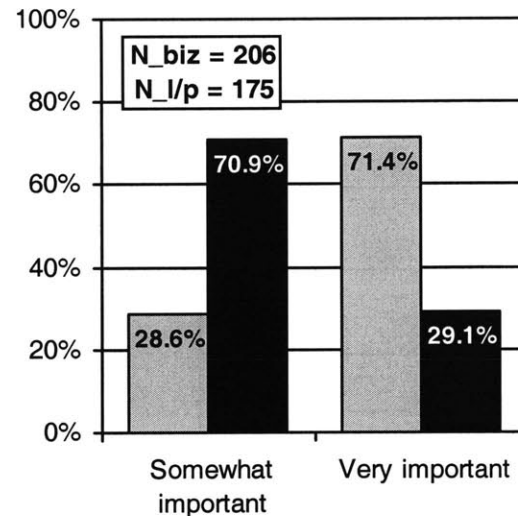


Figure B 381: (Heavy Airline Users) Q10 – (Travel Time) Of those who rated the issue “important,” the degree to which they considered it important

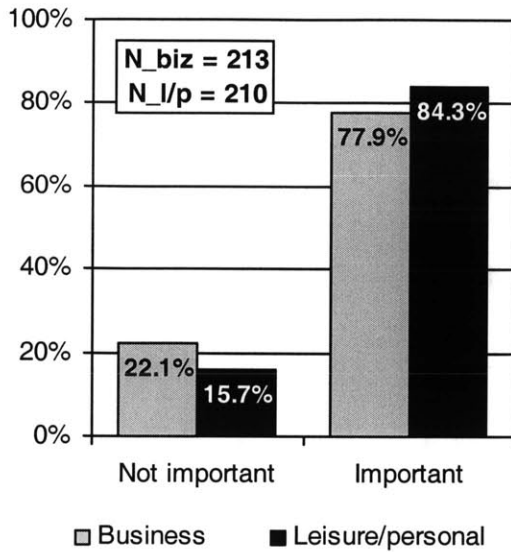


Figure B 382: (Heavy Airline Users) Q10 – (Comfort) How important to you are the following issues in choosing your mode of travel?

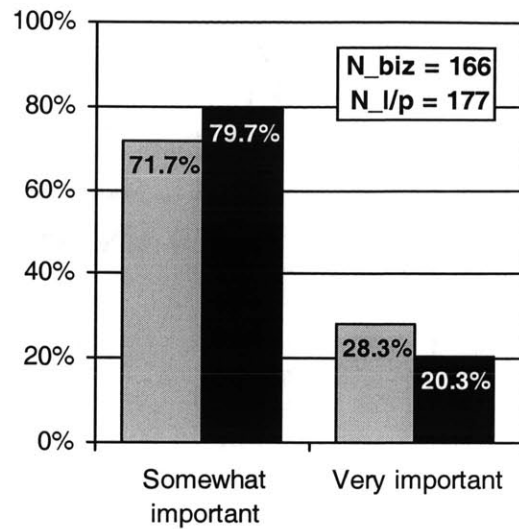


Figure B 383: (Heavy Airline Users) Q10 – (Comfort) Of those who rated the issue “important,” the degree to which they considered it important

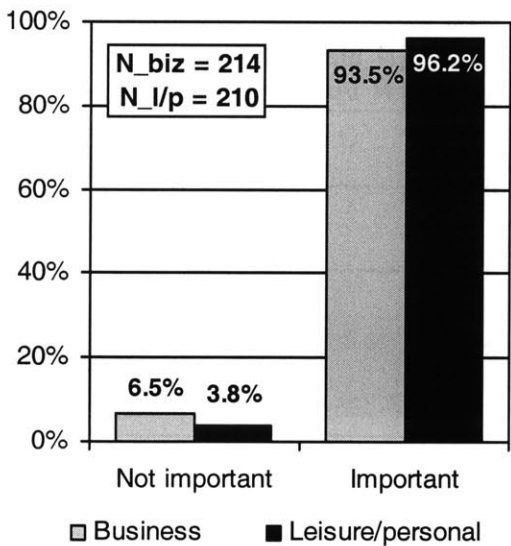


Figure B 384: (Heavy Airline Users) Q10 – (Safety) How important to you are the following issues in choosing your mode of travel?

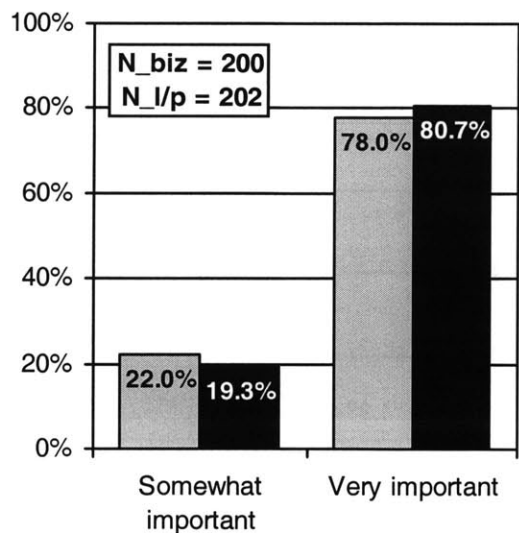


Figure B 385: (Heavy Airline Users) Q10 – (Safety) Of those who rated the issue “important,” the degree to which they considered it important

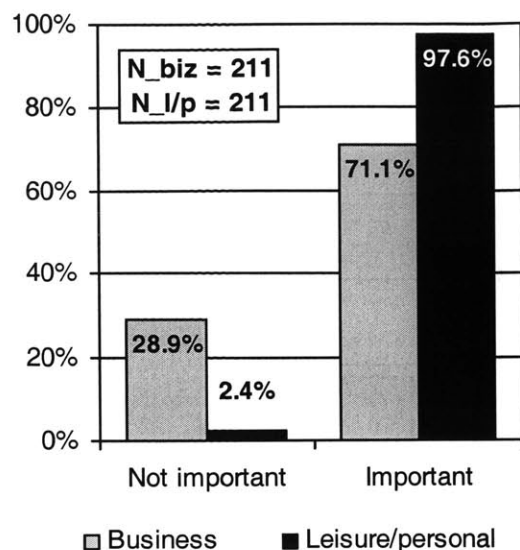


Figure B 386: (Heavy Airline Users) Q10 – (Fun) How important to you are the following issues in choosing your mode of travel?

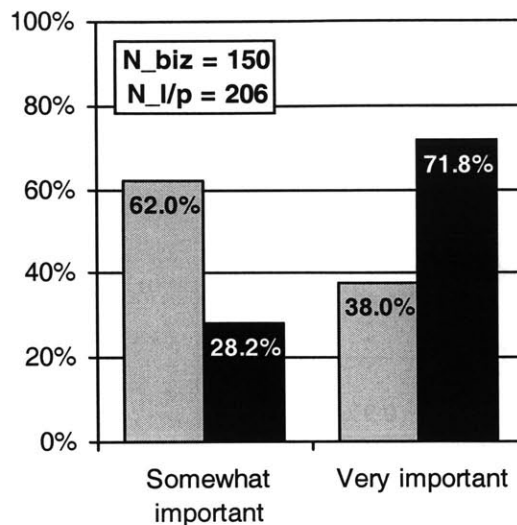


Figure B 387: (Heavy Airline Users) Q10 – (Fun) Of those who rated the issue "important," the degree to which they considered it important

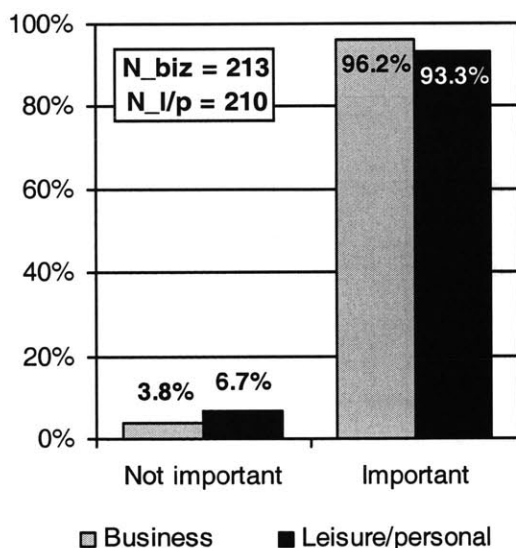


Figure B 388: (Heavy Airline Users) Q10 – (Flexibility) How important to you are the following issues in choosing your mode of travel?

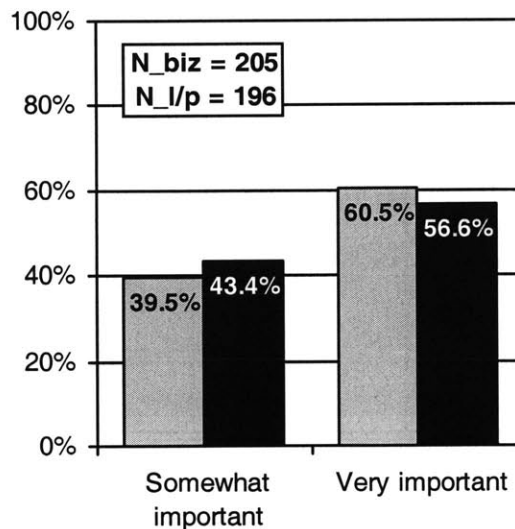


Figure B 389: (Heavy Airline Users) Q10 – (Flexibility) Of those who rated the issue "important," the degree to which they considered it important

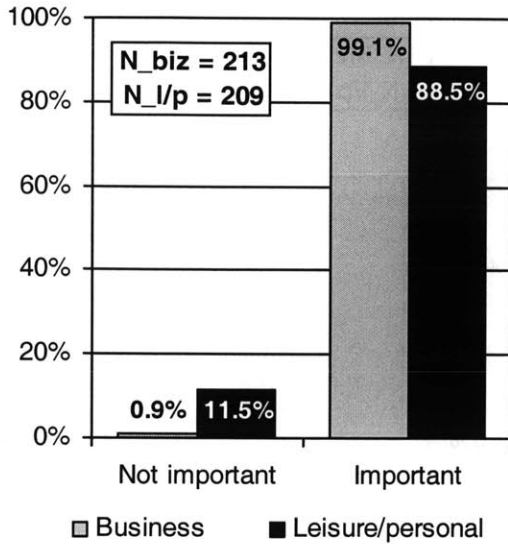


Figure B 390: (Heavy Airline Users) Q10 – (Reliability) How important to you are the following issues in choosing your mode of travel?

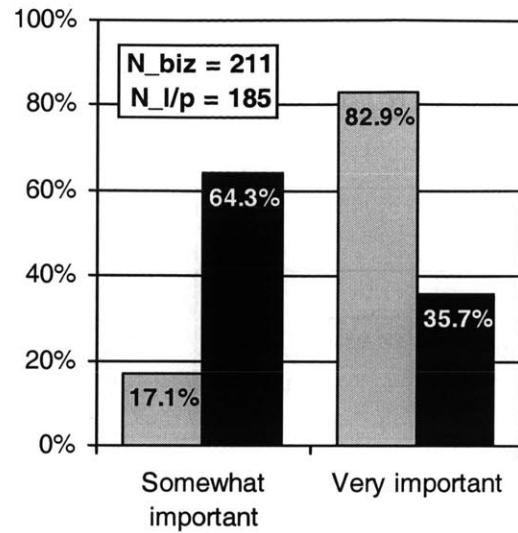


Figure B 391: (Heavy Airline Users) Q10 – (Reliability) Of those who rated the issue “important,” the degree to which they considered it important

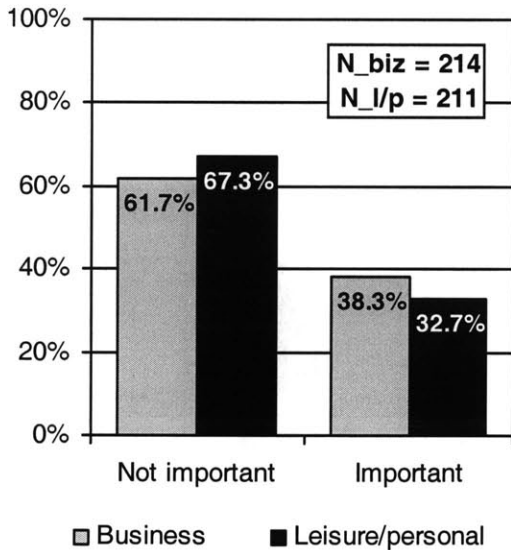


Figure B 392: (Heavy Airline Users) Q10 – (Privacy) How important to you are the following issues in choosing your mode of travel?

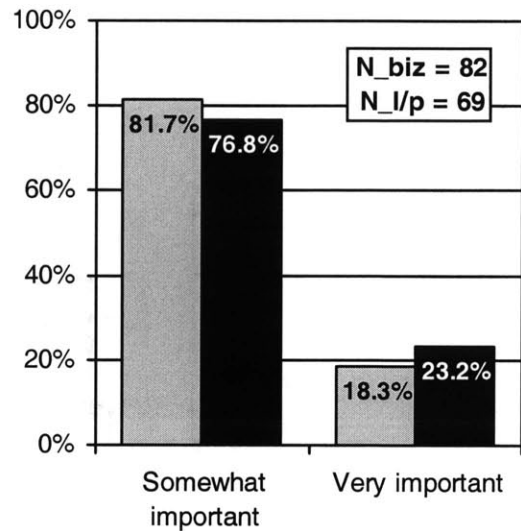


Figure B 393: (Heavy Airline Users) Q10 – (Privacy) Of those who rated the issue “important,” the degree to which they considered it important

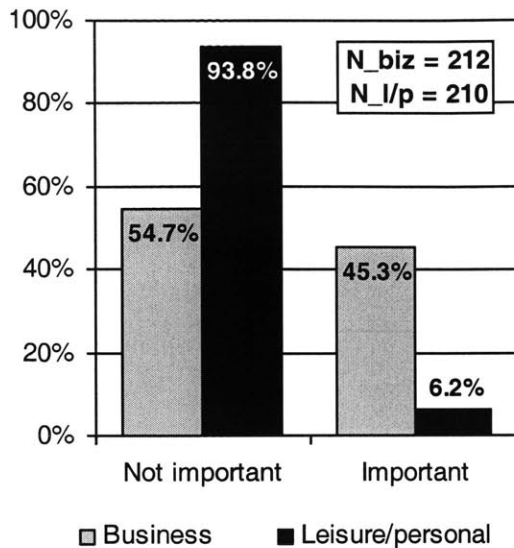


Figure B 394: (Heavy Airline Users) Q10 – (Conduct Business) How important to you are the following issues in choosing your mode of travel?

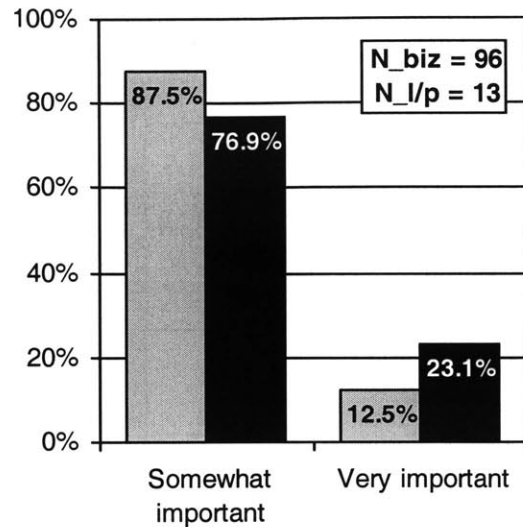


Figure B 395: (Heavy Airline Users) Q10 – (Conduct Business) Of those who rated the issue “important,” the degree to which they considered it important

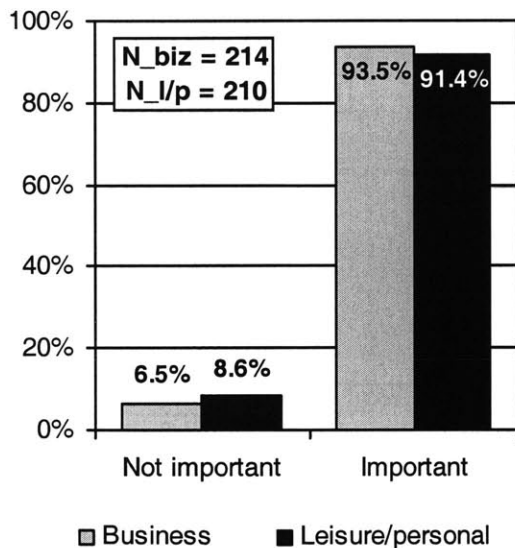


Figure B 396: (Heavy Airline Users) Q10 – (Mobility) How important to you are the following issues in choosing your mode of travel?

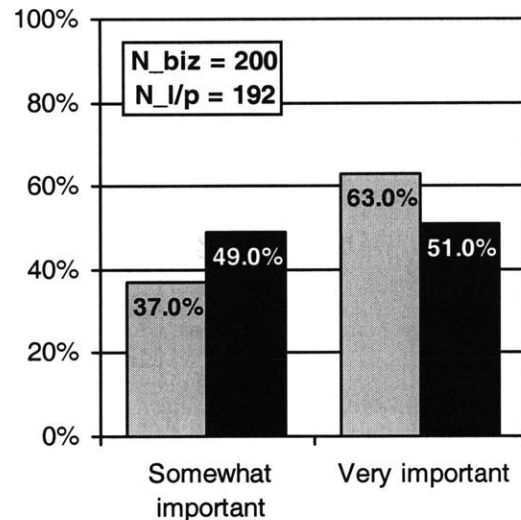


Figure B 397: (Heavy Airline Users) Q10 – (Mobility) Of those who rated the issue “important,” the degree to which they considered it important

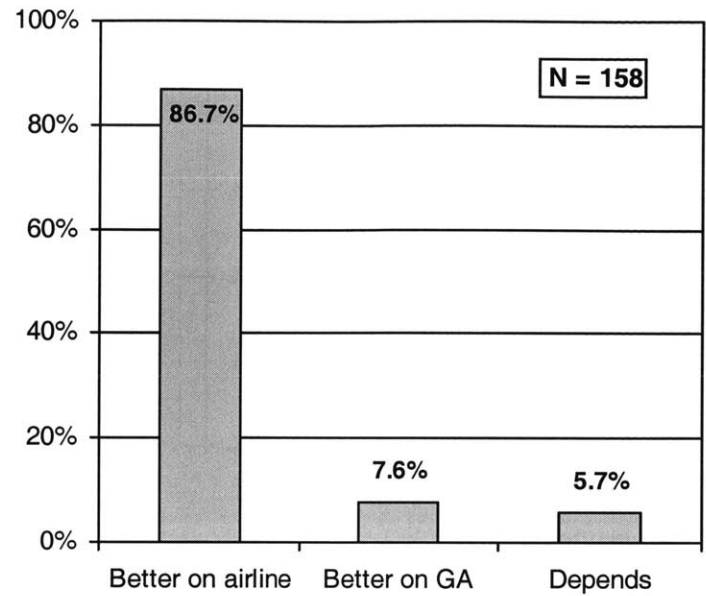


Figure B 398: (Heavy Airline Users) Q11 - Is your ability to conduct business or work while traveling better on an airline than on a GA aircraft?

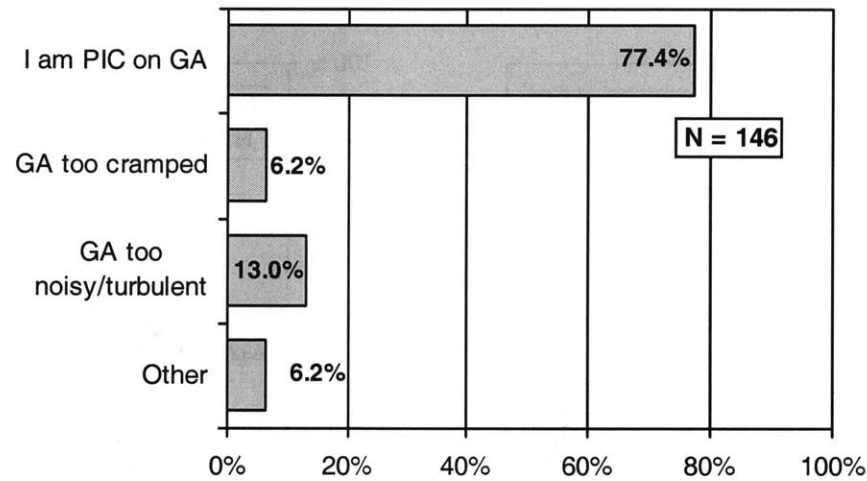


Figure B 399: (Heavy Airline Users) Q11 - Ability to work is better on airline because...

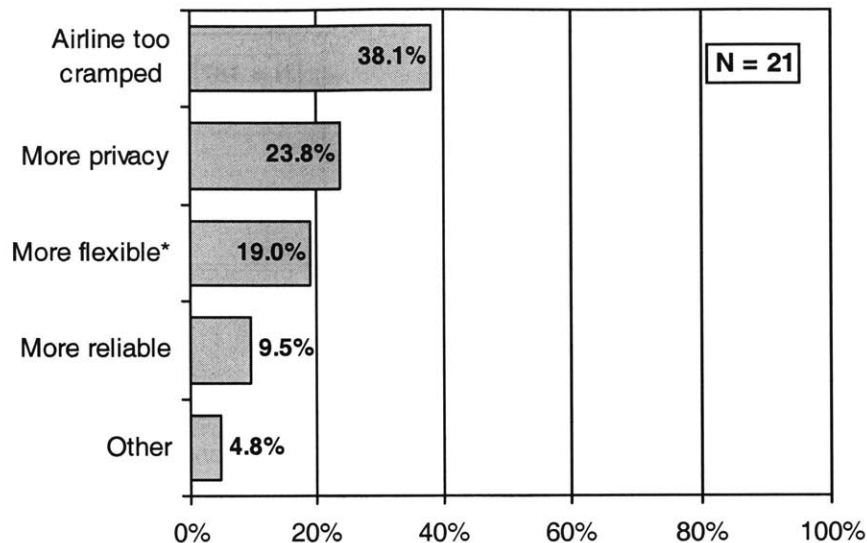


Figure B 400: (Heavy Airline Users) Q11 - Ability to work is better on GA because...

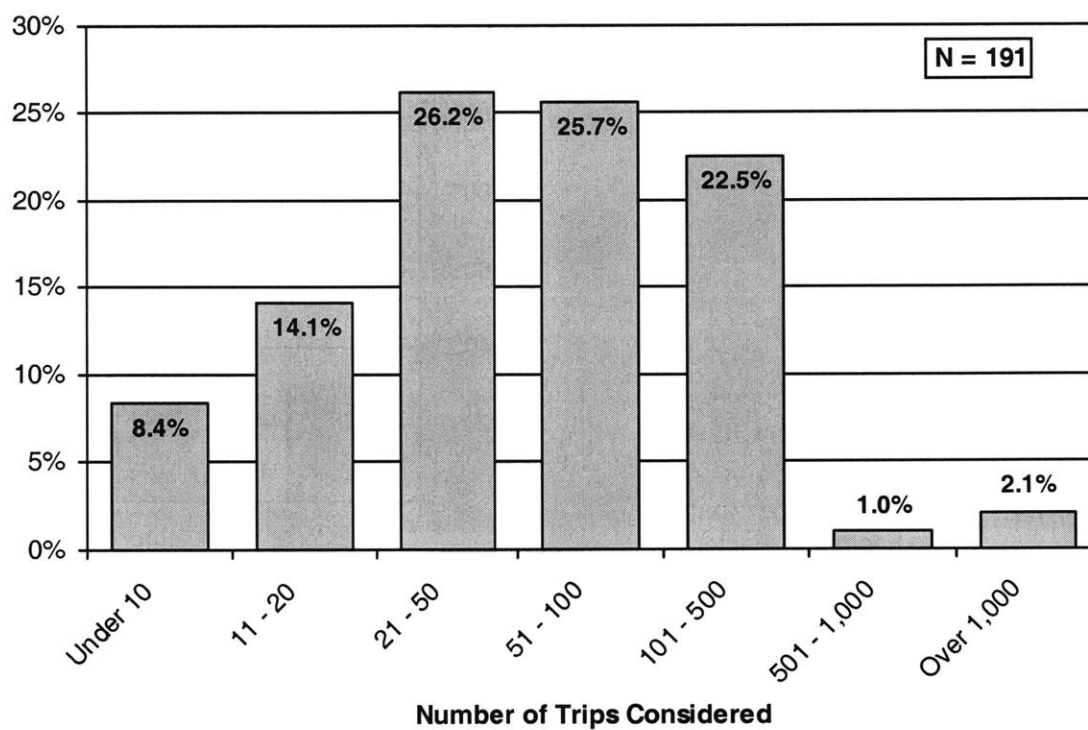


Figure B 401: (Heavy Airline Users) Q12 - Over the last 5 years estimate the number of trips you have considered making by GA aircraft.

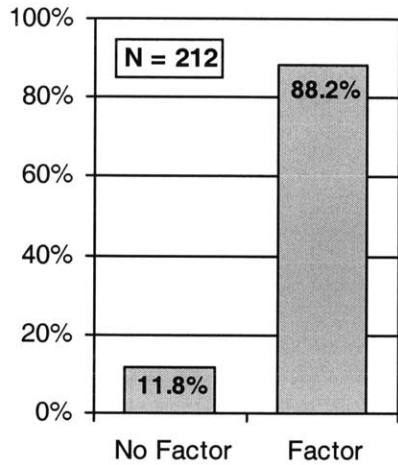


Figure B 402: (Heavy Airline Users) Q13 – (IFR Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

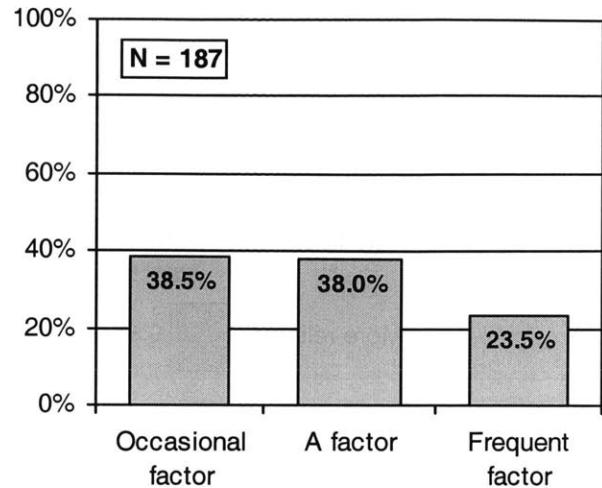


Figure B 403: (Heavy Airline Users) Q13 – (IFR Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

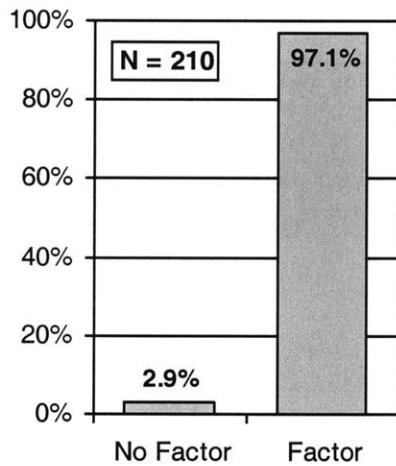


Figure B 404: (Heavy Airline Users) Q13 – (Severe Weather) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

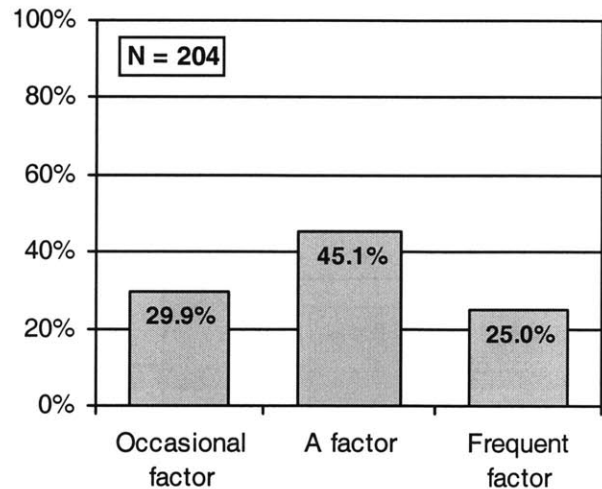


Figure B 405: (Heavy Airline Users) Q13 – (Severe Weather) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

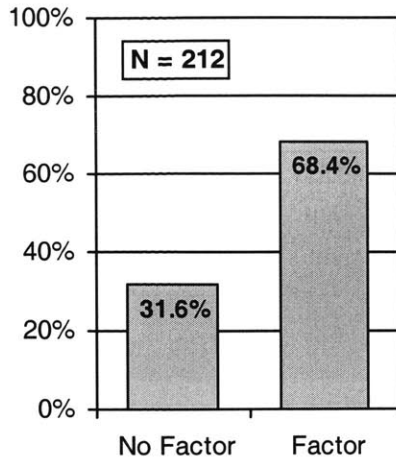


Figure B 406: (Heavy Airline Users) Q13 – (Mechanical Problems) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

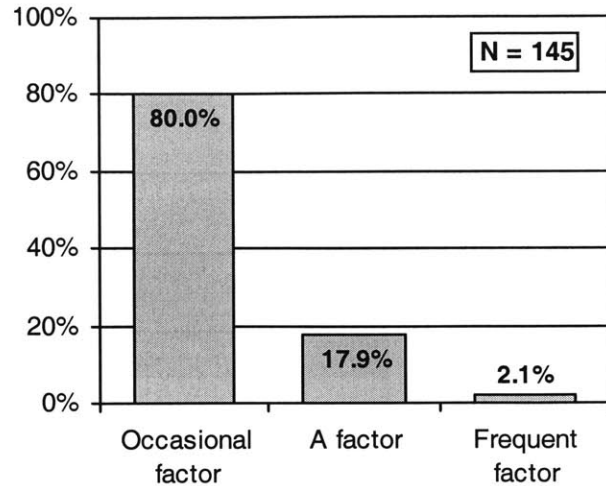


Figure B 407: (Heavy Airline Users) Q13 – (Mechanical Problems) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

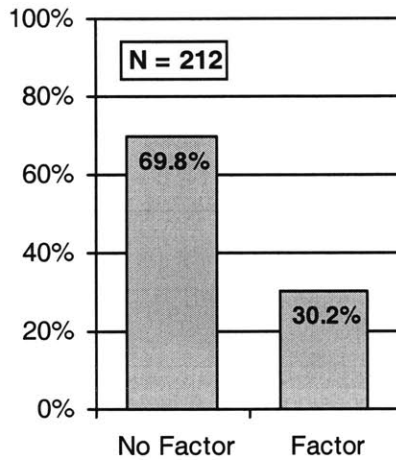


Figure B 408: (Heavy Airline Users) Q13 – (Routine Maintenance) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

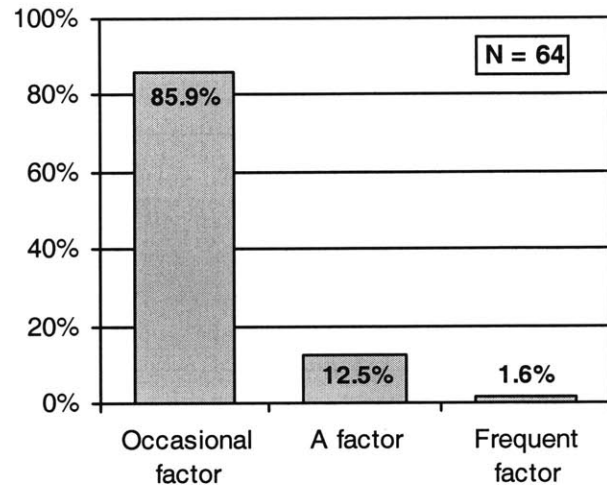


Figure B 409: (Heavy Airline Users) Q13 – (Routine Maintenance) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

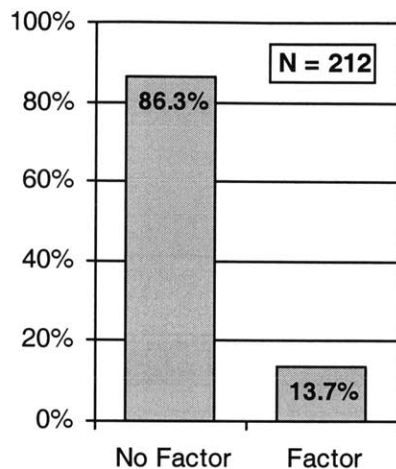


Figure B 410: (Heavy Airline Users) Q13 – (Not Current) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

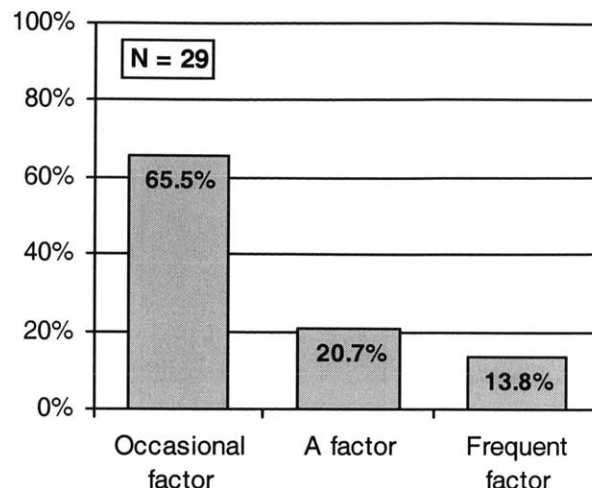


Figure B 411: (Heavy Airline Users) Q13 – (Not Current) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

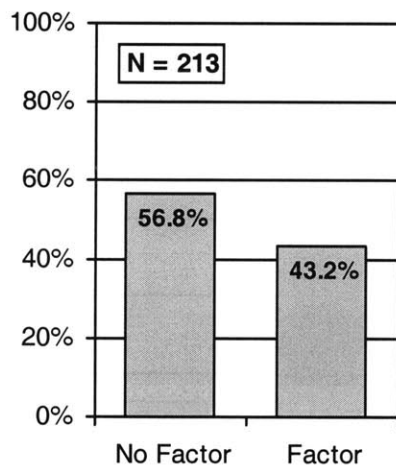


Figure B 412: (Heavy Airline Users) Q13 – (Proficiency) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

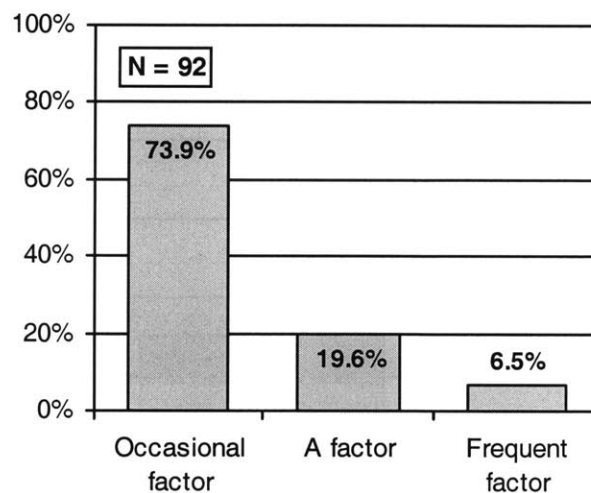


Figure B 413: (Heavy Airline Users) Q13 – (Proficiency) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

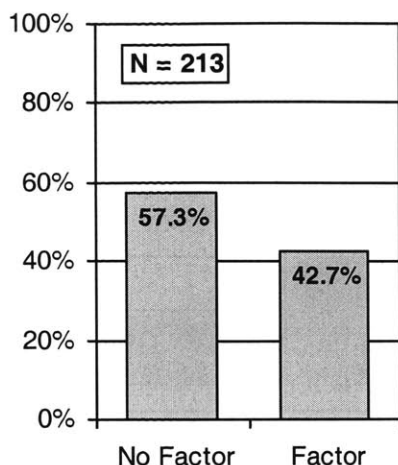


Figure B 414: (Heavy Airline Users) Q13 – (Travel Companions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

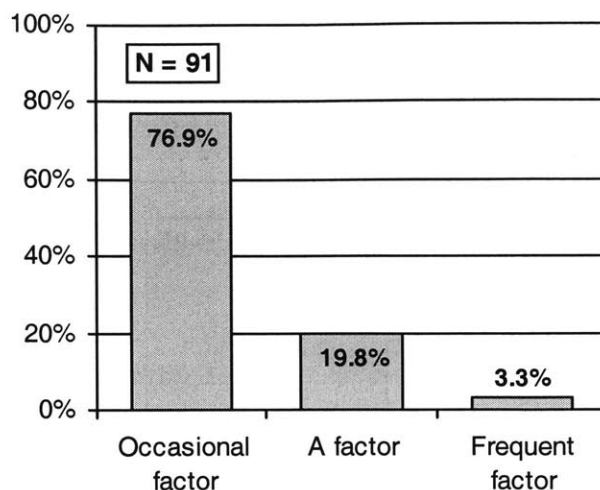


Figure B 415: (Heavy Airline Users) Q13 – (Travel Companions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

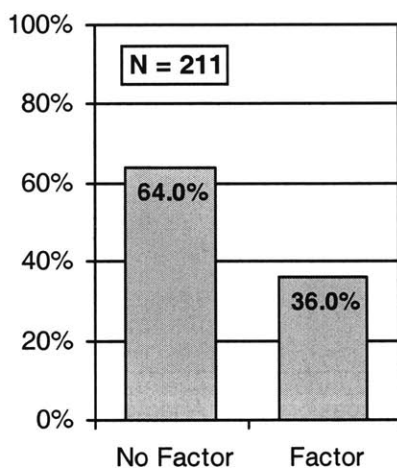


Figure B 416: (Heavy Airline Users) Q13 – (Comfort) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

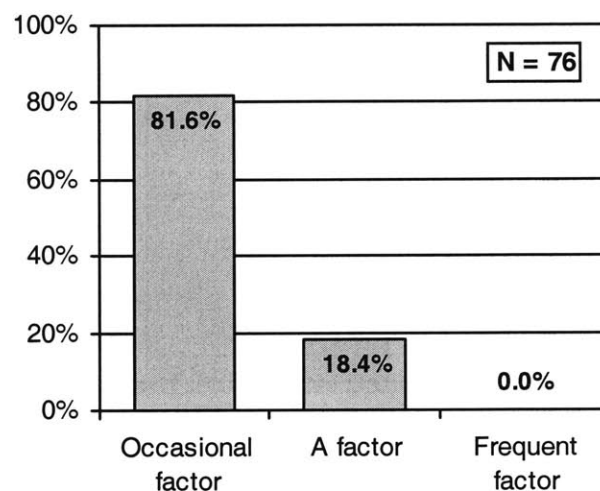


Figure B 417: (Heavy Airline Users) Q13 – (Comfort) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

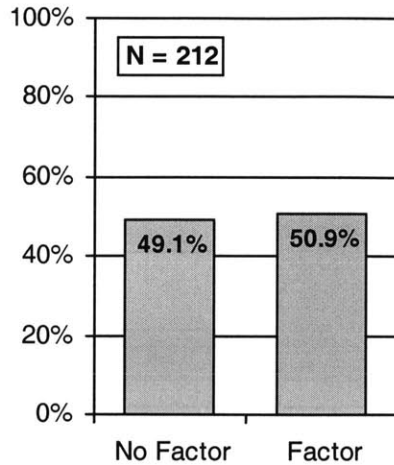


Figure B 418: (Heavy Airline Users) Q13 – (Scheduling) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

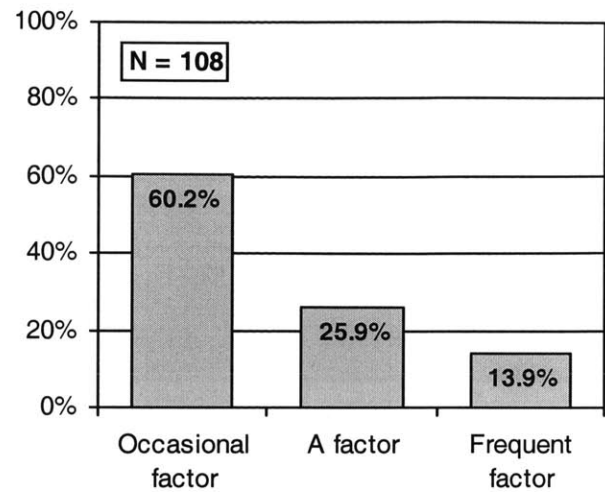


Figure B 419: (Heavy Airline Users) Q13 – (Scheduling) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

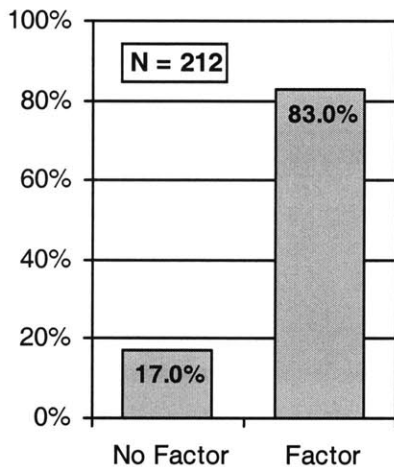


Figure B 420: (Heavy Airline Users) Q13 – (Speed) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

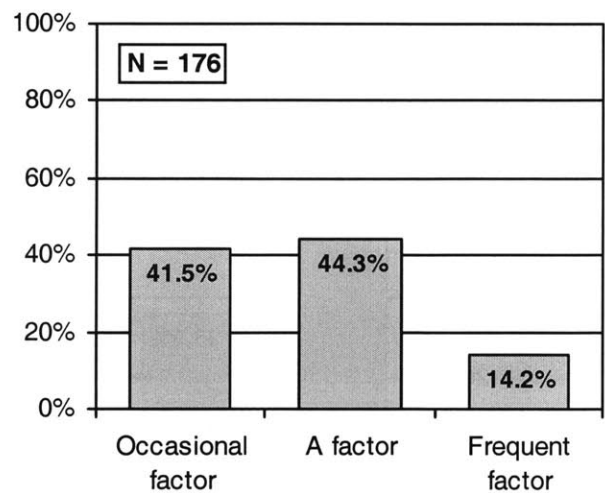


Figure B 421: (Heavy Airline Users) Q13 – (Speed) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

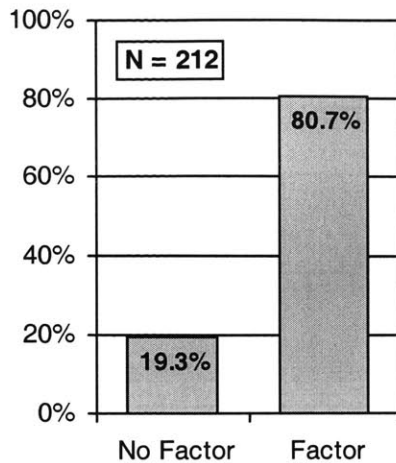


Figure B 422: (Heavy Airline Users) Q13 – (Cost) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

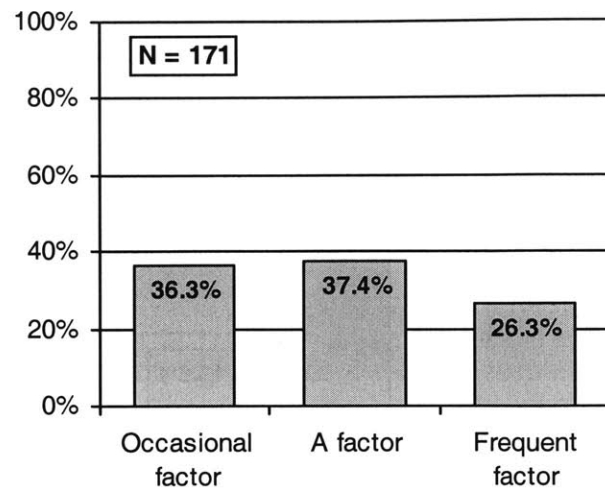


Figure B 423: (Heavy Airline Users) Q13 – (Cost) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

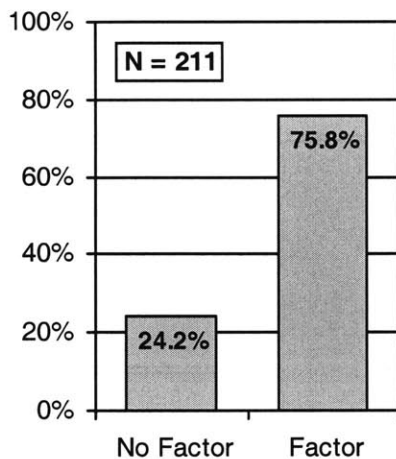


Figure B 424: (Heavy Airline Users) Q13 – (Convenience) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

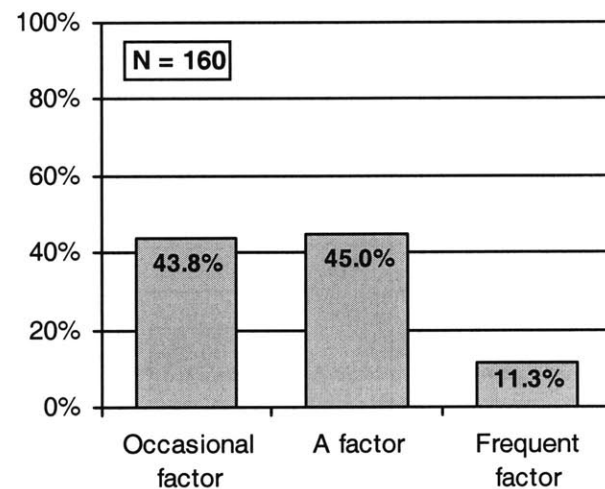


Figure B 425: (Heavy Airline Users) Q13 – (Convenience) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

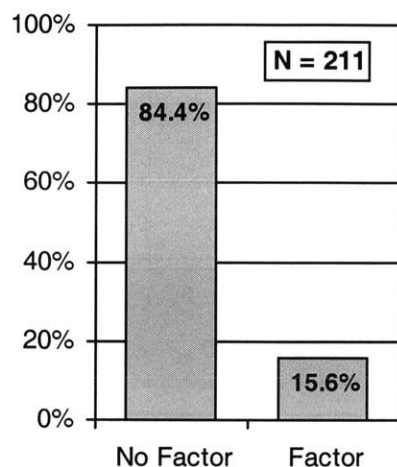


Figure B 426: (Heavy Airline Users) Q13 – (Airspace Congestion) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

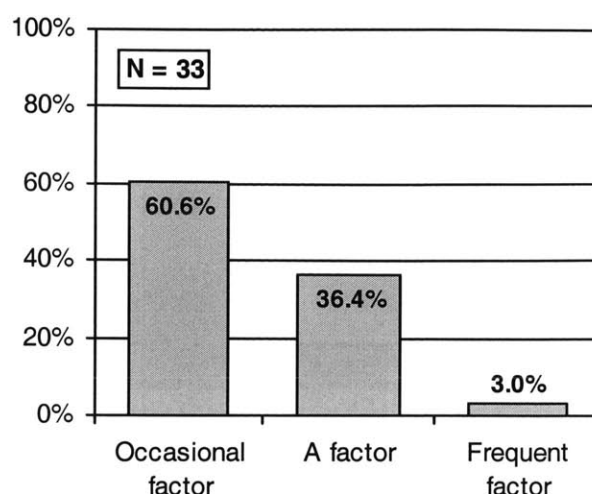


Figure B 427: (Heavy Airline Users) Q13 – (Airspace Congestion) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

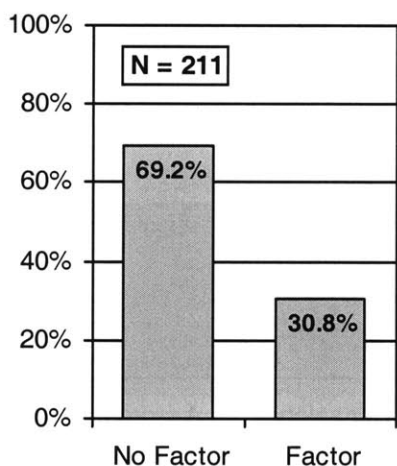


Figure B 428: (Heavy Airline Users) Q13 – (Service Facilities) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

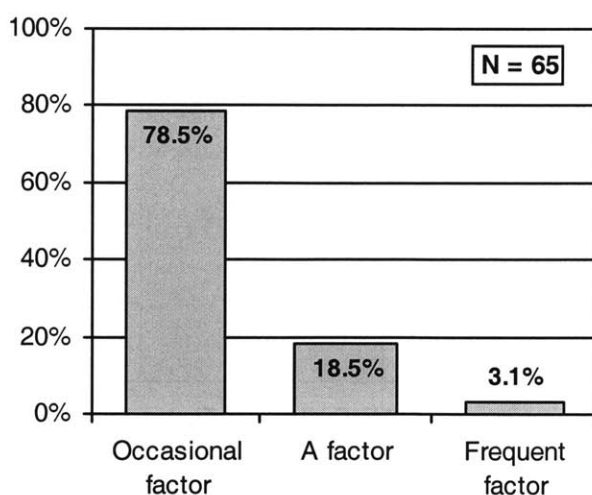


Figure B 429: (Heavy Airline Users) Q13 – (Service Facilities) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

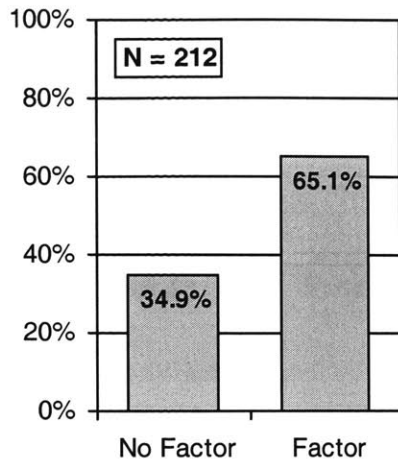


Figure B 430: (Heavy Airline Users) Q13 – (Mobility) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

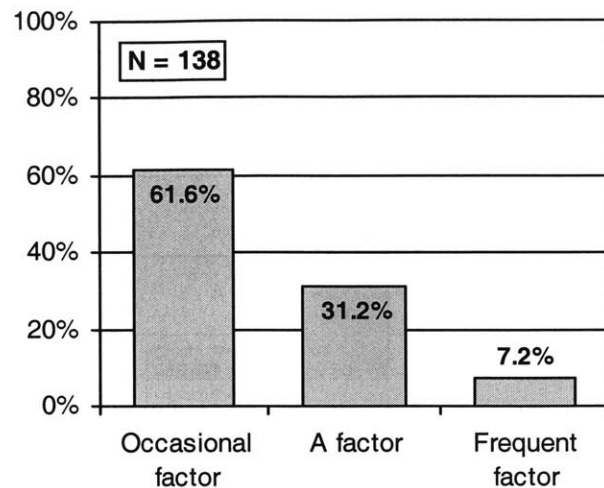


Figure B 431: (Heavy Airline Users) Q13 – (Mobility) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

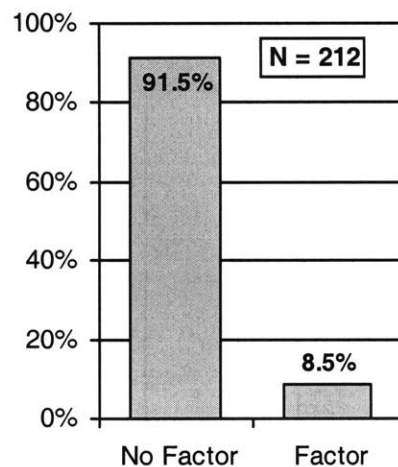


Figure B 432: (Heavy Airline Users) Q13 – (Insurance Restrictions) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

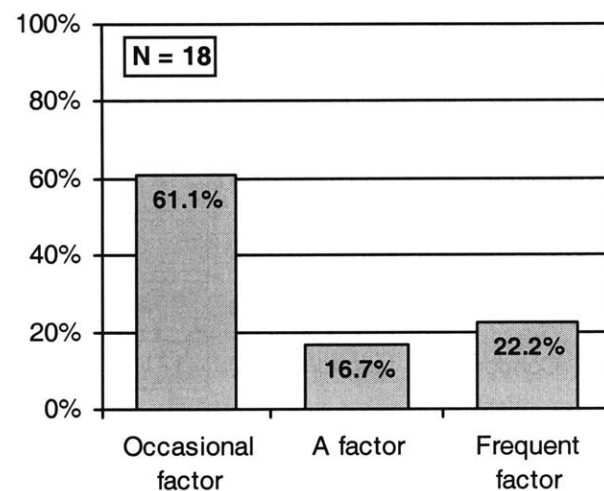


Figure B 433: (Heavy Airline Users) Q13 – (Insurance Restrictions) Of those who rated the issue as a “factor,” the degree to which they considered it a factor.

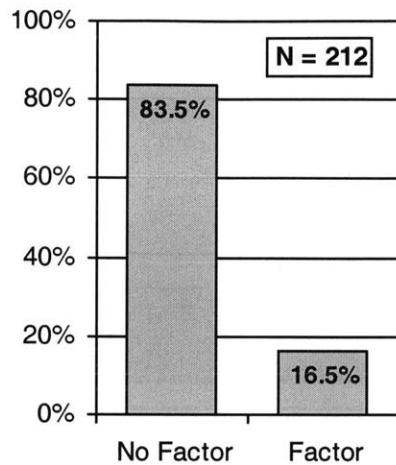


Figure B 434: (Heavy Airline Users) Q13 – (Insurance Costs) Over the last 5 years rate how often the following issues have factored into your decisions to not travel by GA aircraft.

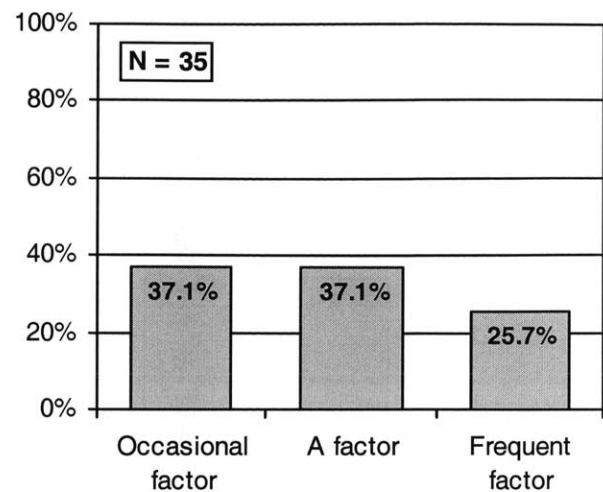


Figure B 435: (Heavy Airline Users) Q13 – (Insurance Costs) Of those who rated the issue as a "factor," the degree to which they considered it a factor.

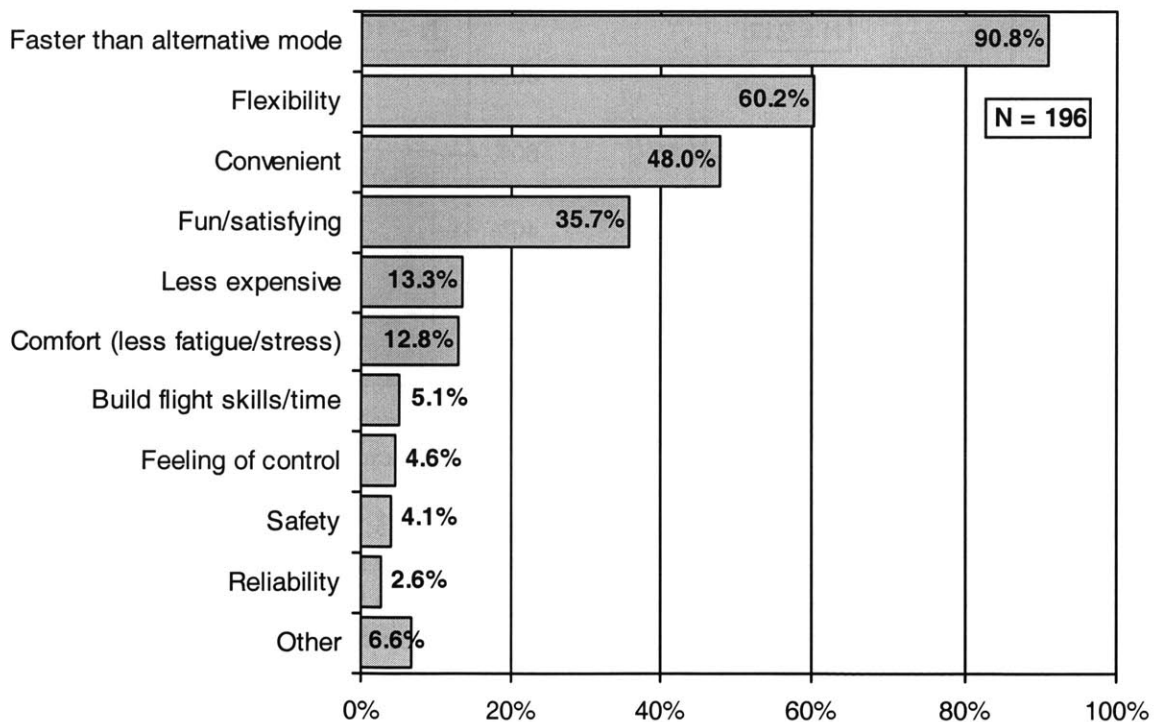


Figure B 436: (Heavy Airline Users) Q14 - What advantages does traveling by GA aircraft have over travel by automobile and scheduled airline?

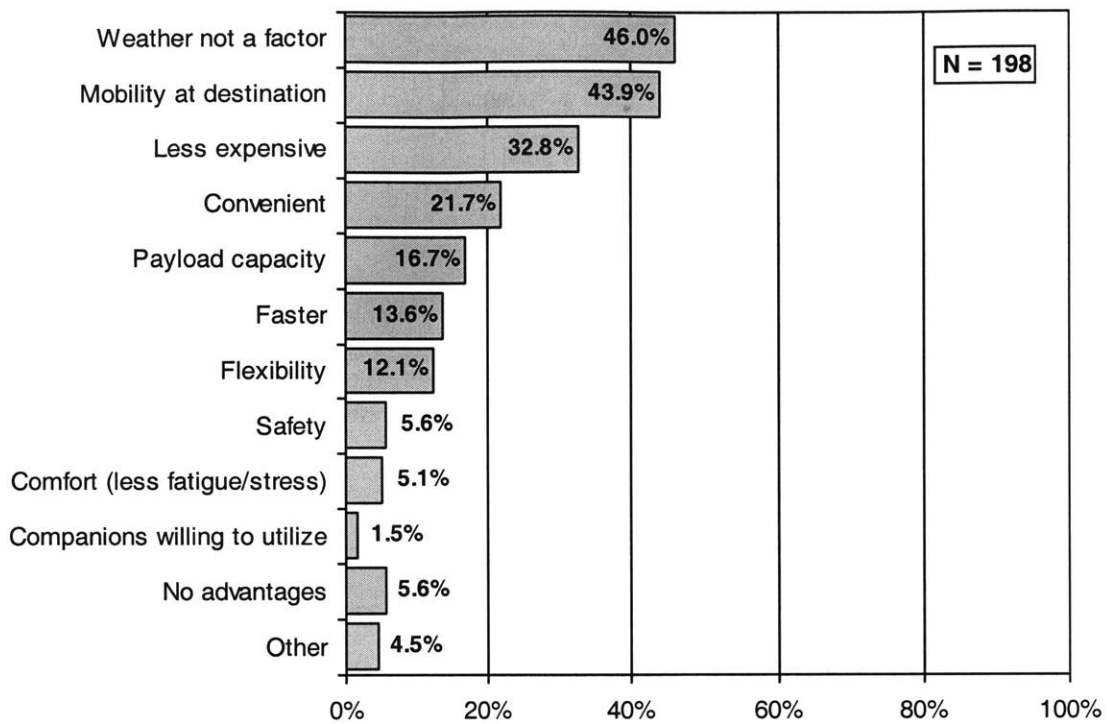


Figure B 437: (Heavy Airline Users) Q15 - What advantages does traveling by automobile have over travel by GA aircraft?

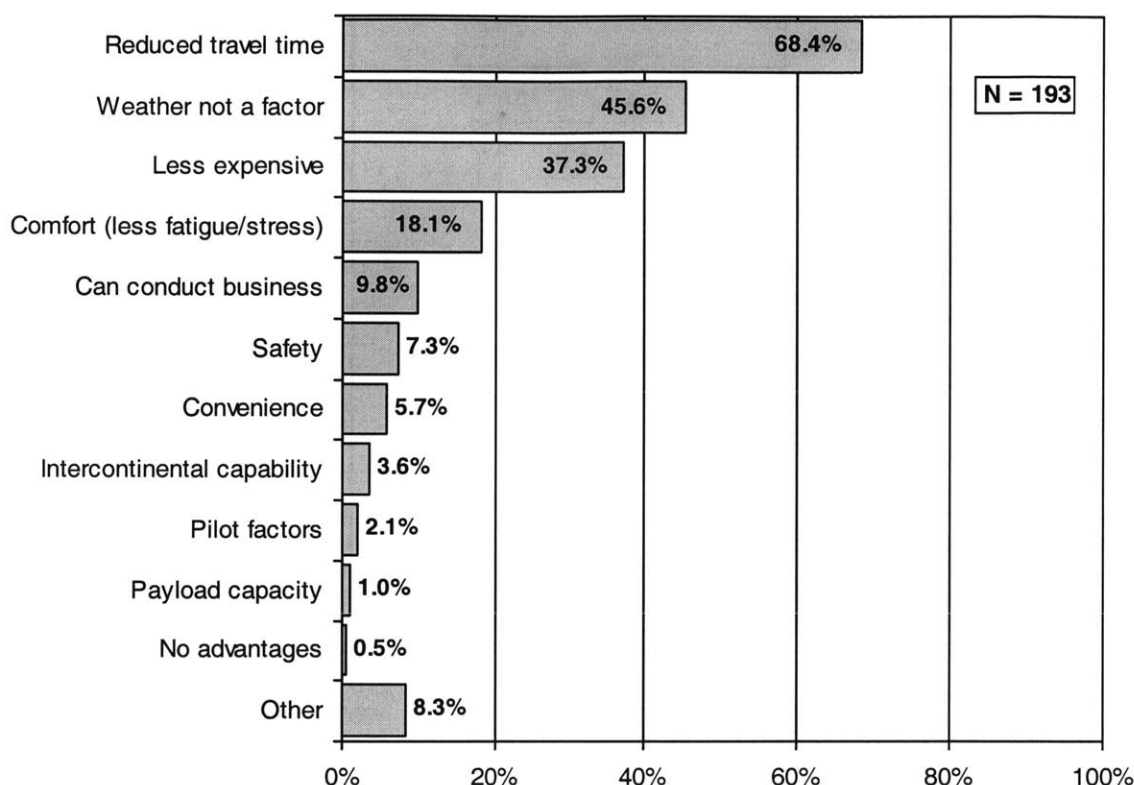


Figure B 438: (Heavy Airline Users) Q16 - What advantages does traveling by scheduled airline have over travel by GA aircraft?

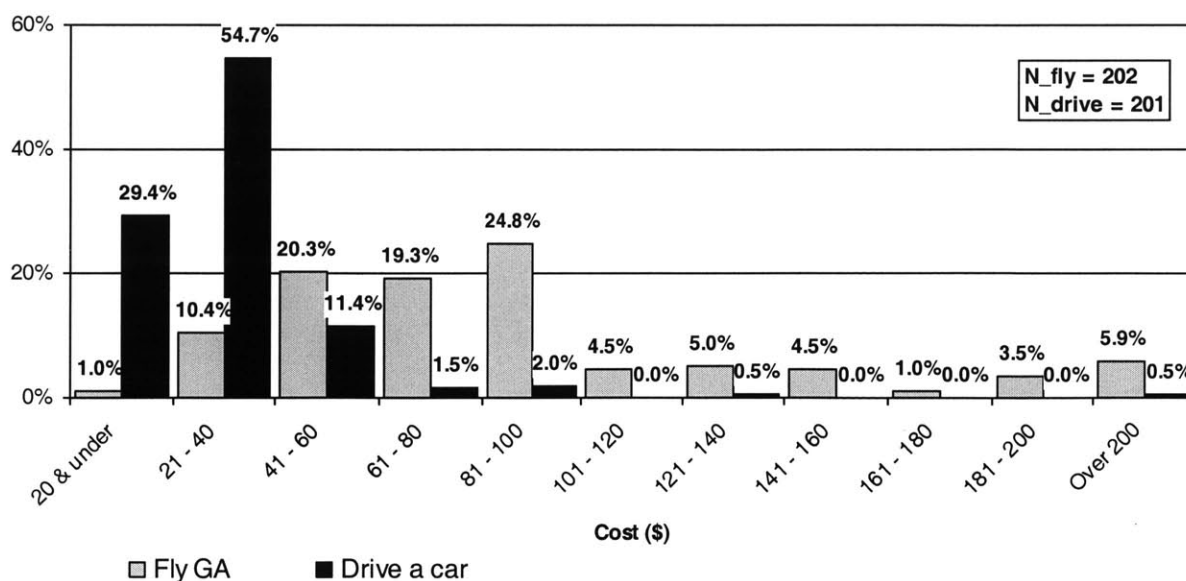


Figure B 439: (Heavy Airline Users) Q17 and Q18 - What would you estimate are your costs to fly GA/drive a car 100 statute miles?

(single engine aircraft only)

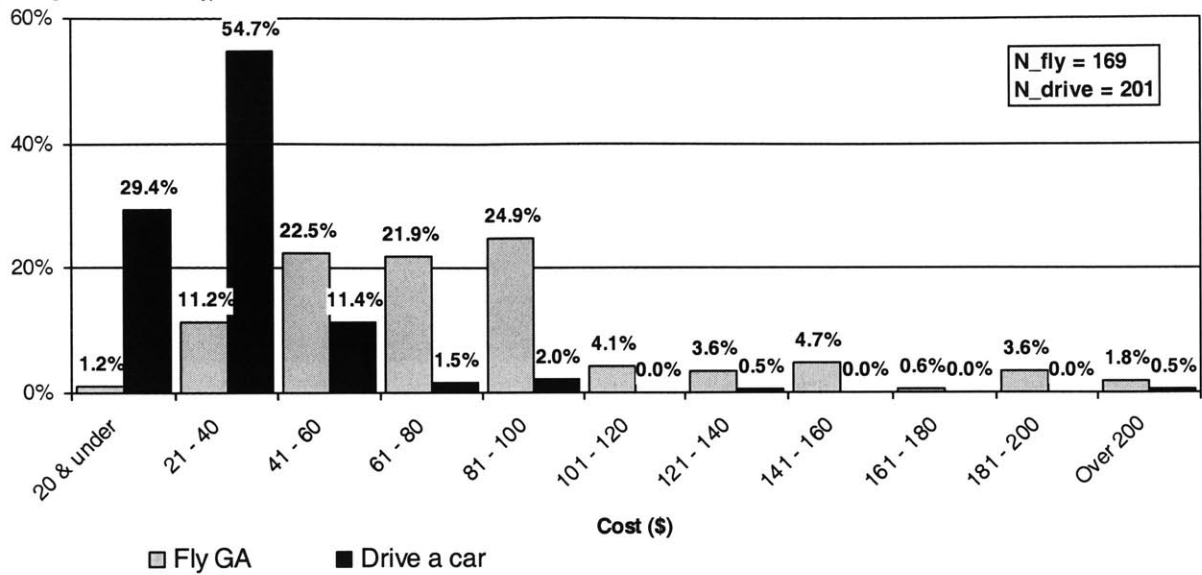


Figure B 440: (Heavy Airline Users) Q17 and Q18 – Estimated Costs To Fly GA For Those Who Considered Single Engine Aircraft Only

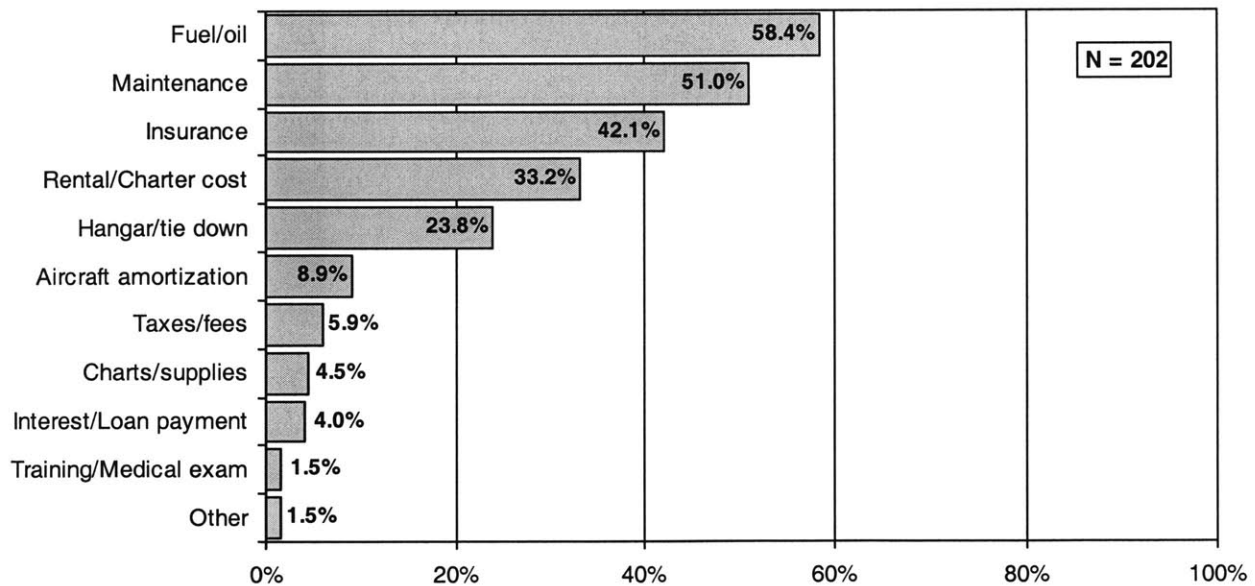


Figure B 441: (Heavy Airline Users) Q17 - What items create this cost to fly 100 statute miles?

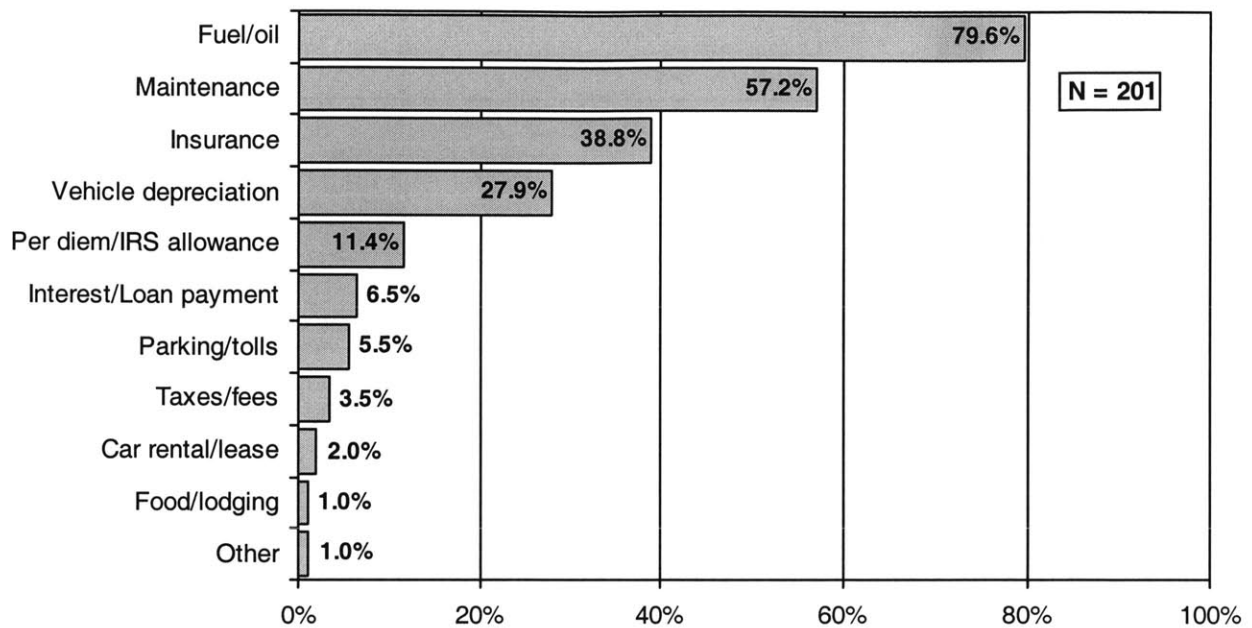


Figure B 442: (Heavy Airline Users) Q18 - What items create this cost to drive a car 100 statute miles?

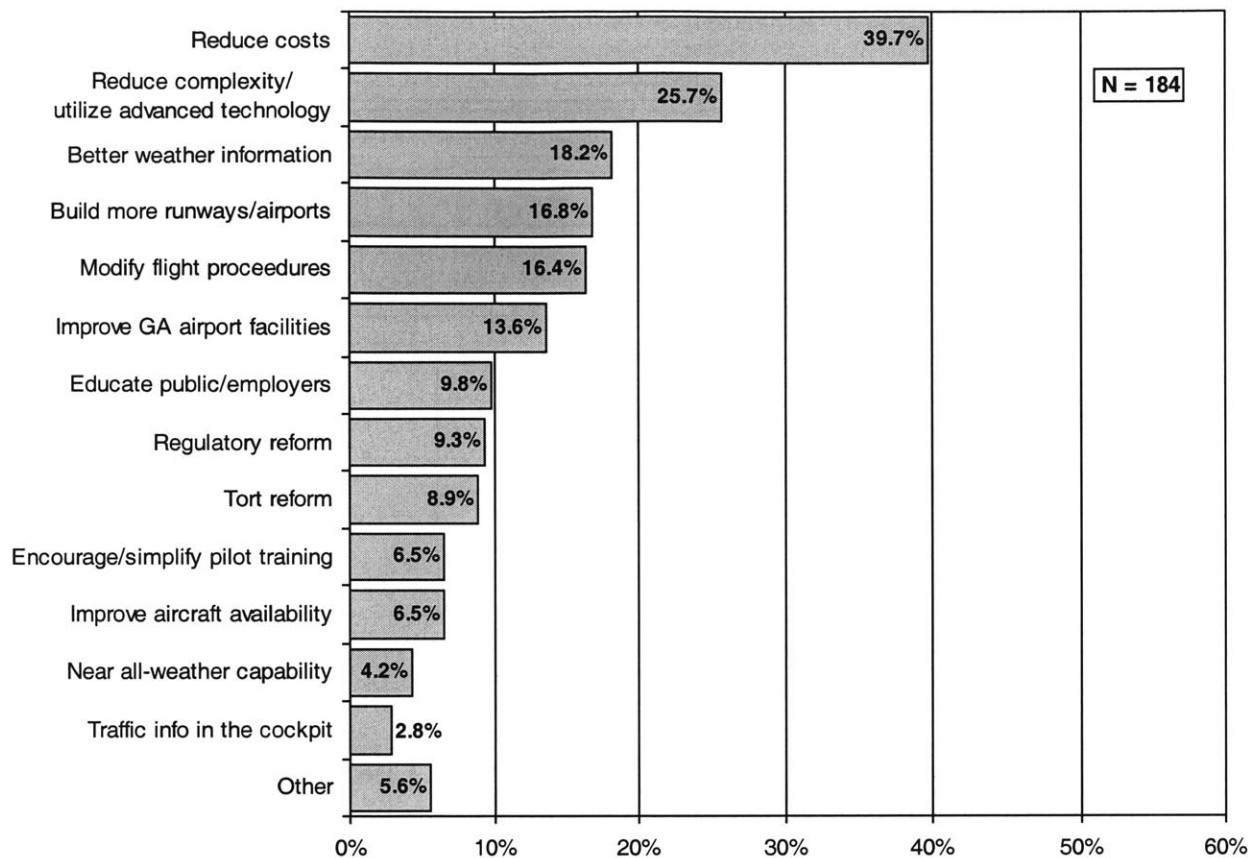


Figure B 443: (Heavy Airline Users) Q19 - What are the most important things that could be done technically or procedurally to reduce barriers to general aviation travel?

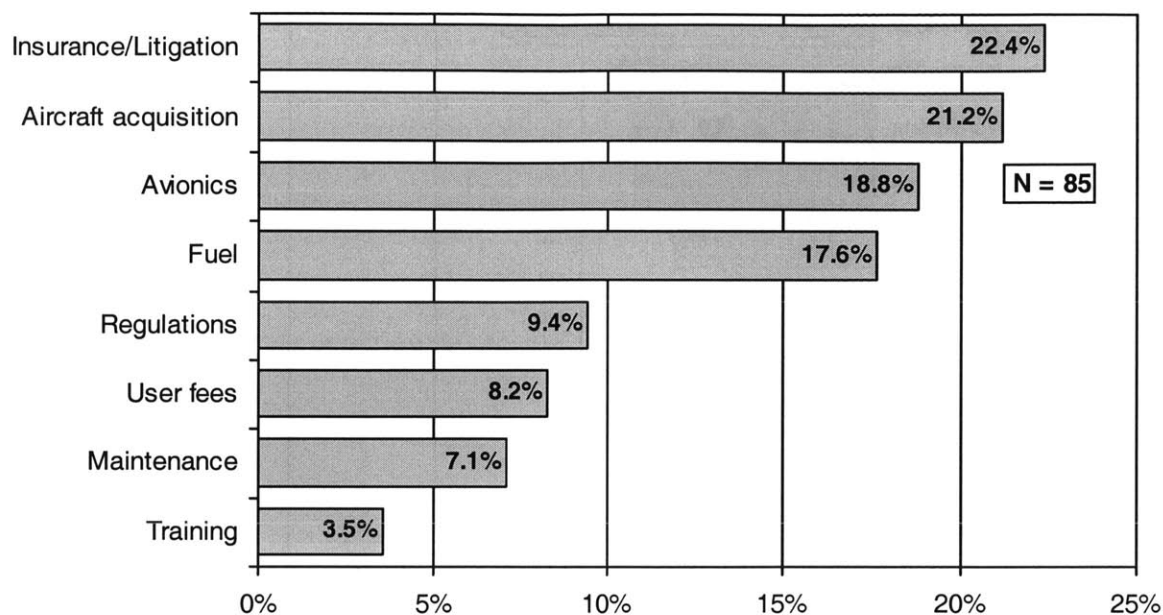


Figure B 444: (Heavy Airline Users) Q19 - Specific Areas Cited For Cost Reduction

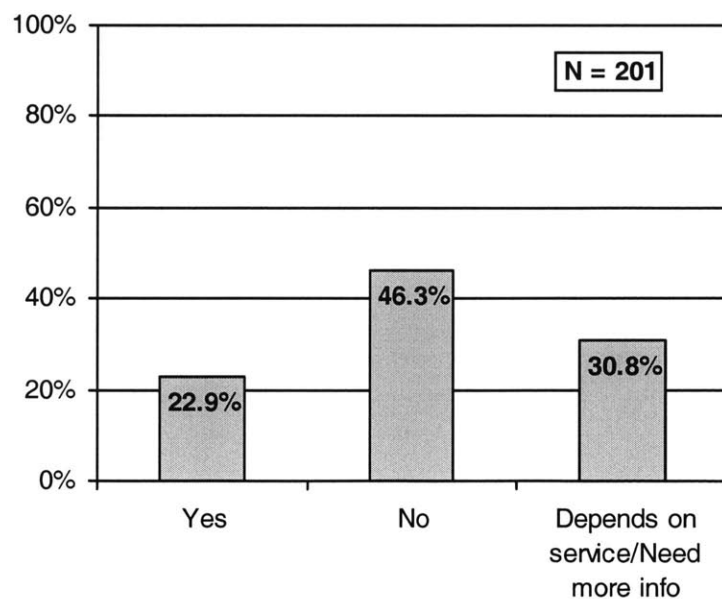


Figure B 445: (Heavy Airline Users) Q20 - Would Those Surveyed Use a Proposed Dispatch Service

APPENDIX C: DERIVATION OF REPRESENTATIVE GENERAL AVIATION AIRCRAFT COSTS

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C1 INTRODUCTION

The costs of travel by general aviation were estimated for use in the mode choice model, as described in Section 3.2.3. Both fixed and variable costs were estimated for three different types of general aviation aircraft: a single engine piston aircraft with a 160 kt cruise speed, a single engine piston aircraft with 190 kt cruise speed, and a twin-engine turbo prop aircraft with a 200 kt cruise speed. The derivation of the costs for each of these examples is documented in this appendix.

C2 SINGLE-ENGINE PISTON COST ESTIMATES (160 KT)

The fixed and variable costs estimated here represent a generic single-engine piston aircraft with a cruise speed of approximately 160 kts true airspeed. The estimates are not intended to represent any specific general aviation aircraft, although the cruise speed and estimated purchase price are representative of a Cirrus SR-20 aircraft, as indicated by *Business & Commercial Aviation*, May 2000.

The estimated fixed costs per hour of flight are shown in Table C I. The insurance rate is estimated at 2% of the purchase price, as recommended by Roskam (1990). The depreciation costs are based on a 10 year depreciation period to 20% residual value, as indicated by the Federal Aviation Administration document, *Economic Values for Evaluation of Federal Aviation Administration Investment and Regulatory Programs*, June 1998. Hangar fees assume a \$50 per month fee, based on rates available at major FBOs and airports in North America in July of 2001. Finance costs assume a 10% down payment and 7% prime interest rate for 10 years, again following methods in Roskam (1990). Total fixed costs, in dollars per year, are the sum of the listed constituent costs. Fixed costs in dollars per hour of flight are calculated by dividing the yearly costs by the annual usage in hours per year. Annual aircraft usage, among all aircraft partners, is based on usage assumptions for general aviation aircraft made in the FAA document cited above.

Table C I: Estimated Fixed Costs for a Single-Engine Piston Aircraft (160 kt)

Purchase Price	200,000	\$
Annual Usage	400	hr/yr
Insurance	4,000	\$/year
Depreciation	16,000	\$/year
Hangar	600	\$/year
Financing	19,260	\$/year
Total Fixed Costs	39,860	\$/year
	99.70	\$/hr

The estimated variable costs per hour of flight are shown in Table C II. The constituent costs for fuel, oil and maintenance are based on estimated costs for a 4-9 seat single-engine piston aircraft listed in the FAA document cited above.

Table C II: Estimated Variable Costs for a Single-Engine Piston Aircraft (160 kt)

Fuel & Oil	30.00	\$/hr
Maintenance	40.00	\$/hr
Total Variable Costs	70.00	\$/hr

C3 SINGLE-ENGINE PISTON COST ESTIMATES (190 KT)

The fixed and variable costs estimated here represent a generic single-engine piston aircraft with a cruise speed of approximately 190 kts true airspeed. The estimates are not intended to represent any specific general aviation aircraft, although the cruise speed and estimated purchase price are representative of a Lancair Columbia 300 aircraft, as indicated by *Business & Commercial Aviation*, May 2000.

The estimated fixed costs per hour of flight are shown in Table C III. The insurance rate is estimated at 2% of the purchase price, as recommended by Roskam (1990). The depreciation costs are based on a 10 year depreciation period to 20% residual value, as indicated by the Federal Aviation Administration document, *Economic Values for Evaluation of Federal Aviation Administration Investment and Regulatory Programs*, June 1998. Hangar fees assume a \$50 per month fee, based on rates available at major FBOs and airports in North America in July of 2001. Finance costs assume a 10% down payment and 7% prime interest rate for 10 years, again following methods in Roskam (1990). Total fixed costs, in dollars per year, are the sum of the listed constituent costs. Fixed costs in dollars per hour of flight are calculated by dividing the yearly costs by the annual usage in hours per year. Annual aircraft usage, among all aircraft partners, is based on usage assumptions for general aviation aircraft made in the FAA document cited above.

Table C III: Estimated Fixed Costs for a Single-Engine Piston Aircraft (190 kt)

Purchase Price	290,000	\$
Annual Usage	400	hr/yr
Insurance	5,800	\$/year
Depreciation	23,200	\$/year
Hangar	600	\$/year
Financing	<u>27,927</u>	<u>\$/year</u>
Total Fixed Costs	57,527	\$/year
	143.80	\$/hr

The estimated variable costs per hour of flight are shown in Table C IV. The constituent costs for fuel, oil and maintenance are based on estimated costs for a 4-9 seat single-engine piston aircraft listed in the FAA document cited above.

Table C IV: Estimated Variable Costs for a Single-Engine Piston Aircraft (190 kt)

Fuel & Oil	30.00	\$/hr
Maintenance	<u>40.00</u>	<u>\$/hr</u>
Total Variable Costs	70.00	\$/hr

C4 TWIN-ENGINE TURBO PROP COST ESTIMATES

The fixed and variable costs estimated here represent a generic twin-engine turbo prop aircraft with a cruise speed of approximately 200 kts true airspeed. The estimates are not intended to represent any specific general aviation aircraft, although the cruise speed and estimated purchase price are representative of a Piper Seneca V aircraft, as indicated by *Business & Commercial Aviation*, May 2000.

The estimated fixed costs per hour of flight are shown in Table C V. The insurance rate is estimated at 2% of the purchase price, as recommended by Roskam (1990). The depreciation costs are based on a 10 year depreciation period to 20% residual value, as indicated by the Federal Aviation Administration document, *Economic Values for Evaluation of Federal Aviation Administration Investment and Regulatory Programs*, June 1998. Hangar fees assume a \$50 per month fee, based on rates available at major FBOs and airports in North America in July of 2001. Finance costs assume a 10% down payment and 7% prime interest rate for 10 years, again following methods in Roskam (1990). Total fixed costs, in dollars per year, are the sum of the listed constituent costs. Fixed costs in dollars per hour of flight are calculated by dividing the yearly costs by the annual usage in hours per year. Annual aircraft usage, among all aircraft partners, is based on usage assumptions for general aviation aircraft made in the FAA document cited above.

Table C V: Estimated Fixed Costs for a Twin-Engine Turbo Prop Aircraft

Purchase Price	550,000	\$
Annual Usage	400	hr/yr
Insurance	11,000	\$/year
Depreciation	44,000	\$/year
Hanger	600	\$/year
<u>Financing</u>	<u>52,965</u>	<u>\$/year</u>
Total Fixed Costs	108,565	\$/year
	271.40	\$/hr

The estimated variable costs per hour of flight are shown in Table C VI. The constituent costs for fuel, oil and maintenance are based on estimated costs for a 4-9 seat twin-engine aircraft listed in the FAA document cited above.

Table C VI: Estimated Variable Costs for a Twin-Engine Turbo Prop Aircraft

Fuel & Oil	66.00	\$/hr
<u>Maintenance</u>	<u>99.00</u>	<u>\$/hr</u>
Total Variable Costs	165.00	\$/hr

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